

BLM - ALASKA RESOURCES LIBRARY
GB645.R67
Permafrost in taiga forests /

ALASKA RESOURCES LIBRARY
U.S. DEPT. OF INTERIOR

OLAF OLSON - SOILS



GB
645
R67

DEPT. OF INTERIOR - ALASKA
BUREAU OF LAND MANAGEMENT

CONTRACT 52500-CT5-87 1975

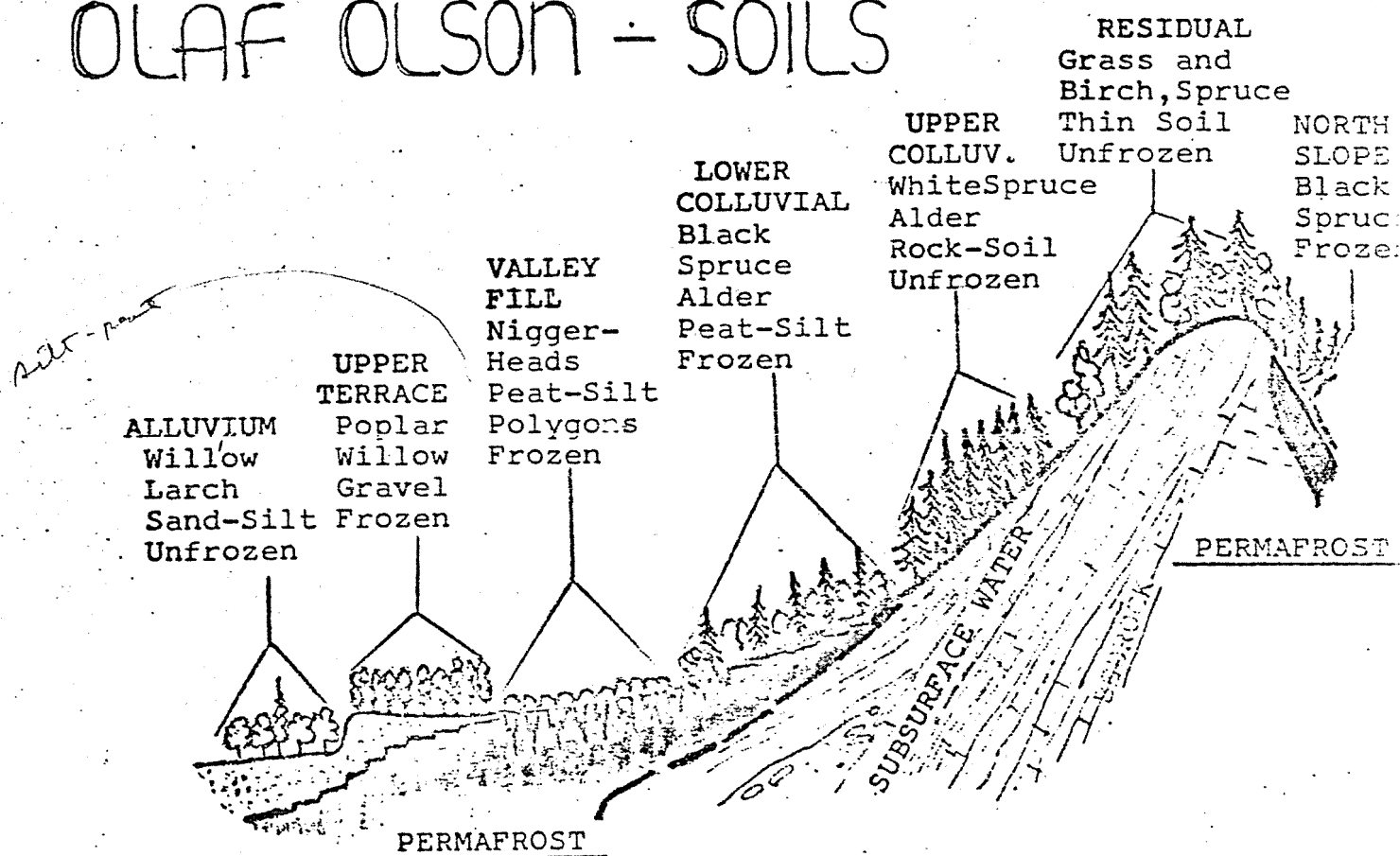
PERMAFROST IN TAIGA FORESTS

BY MARVIN ROSA

ALASKA RESOURCES LIBRARY
U.S. DEPT. OF INTERIOR

FOREST HYDROLOGIST

OLAF OLSON - SOILS



LANDFORM, VEGETATION, SOILS, AND PERMAFROST, INTERIOR ALASKA

U.S. DEPT. OF INTERIOR - ALASKA

BUREAU OF LAND MANAGEMENT

CONTRACT 52500-CT5-87 1975

BUREAU OF LAND
MANAGEMENT
MAIL ROOM

JAN 6 10 45 AM '76

RECEIVED
ANCHORAGE AK.

SEP 10 1985

ALASKA RESOURCES LIBRARY
U.S. DEPT. OF INTERIOR

6000 Highland Dr.
Vancouver, Wash.
Jan. 5, 1976

Mr. Curtis V. McVey
State Director BLM
Anchorage, Alaska

Dear Curt:

re: 7380 (933)

In accordance with your letter of May 23, 1975 re:
Personal Service Contract No. 52500-CT5-87 with
J. Marvin Rosa for "Mapping Critical Permafrost
Areas in Taiga Forests of Interior Alaska" 1974-75.
The attached report is forwarded from Ole Olson,
Soils Consultant, for the information of Lyle Linnell.
An outline for the entire report is attached (to
follow the instructions in your letter); the attached
report on Soil Erosion Potentials should probably
be included under the heading: Discussion and
Conclusion or Summary.

I am awaiting comments on my letter of 11-20-75 from
Lyle before sending a draft of my section on "Maps".
I believe that a copy of Ole's Monograph is so
excellent that it should be sent to Wash. D.C.
in appreciation of their early support of this
project. Does Welker and Davis still work in W.O.?
I await your instructions.

Regards,


J. Marvin Rosa
Forest Hydrologist (retired)

Encl:
Draft Report "Soil Erosion Potentials"
by Olaf Olson, Chief Soils Scientist (retired)

PERMAFROST IN TAIGA FORESTS OF INTERIOR ALASKA

Table of Contents

ABSTRACT

FOREWORD

INTRODUCTION

DEFINITIONS

INTRODUCTION

PHOTO INTERPRETATION

PERMAFROST IDENTIFICATION

PERMAFROST CLASSIFICATION

RESEARCH SUMMARY

HYPOTHESIS

METHODS

INTRODUCTION

JUSTIFICATION

OBJECTIVES

PROJECT PLANS

TEMPERATURE INVERSIONS

SUMMARY OF FIGURES

RESULTS

INTRODUCTION

FIRE WEATHER MAPS

PERMAFROST INDICES

CLIMATIC OVERLAYS

SUMMARY OF MAPS

DISCUSSION

SCS SOIL SURVEYS

AERIAL PHOTOS

CONCLUSION

by G. S. Olson
(attached)

ABSTRACT

In scientific literature, Permafrost has been classified broadly on the basis of temperature zones around the Arctic World. The temperature of the ice underground (30'-50') is 12°-16°F. under Arctic Tundra in a continuous zone where annual air temperatures average 10°-20°F. and the ice is 23°-30°F. in Interior Alaska Forests in a discontinuous zone where air is 20°-32°F. Permafrost-free areas with only isolated ice masses at above 30°F. occur with air 32°-34°F. }

This project was funded in 1974 to map these zones in a detailed (1"=1mi.) elevational aspect along accessible highways. Critical permafrost temperatures occur in a narrow zone where the ice would recede if the surface insulation was disturbed. This zone is located by adjusting observed air temperatures for slope-aspect and elevation using lapse rates of -3.5°F/1000' in summer and winter inversions of 10.8°F/1000 feet. If ground temperatures average 6°F. warmer than the air, then the zone of 25° to 27°F. would be most critical; that is, 25°F. plus 6°F. equals 31°F. or incipient melting.

Within this zone during the summer of 1975, field work located the fine-grained deep soils with poor drainage, which infers that "Aufeis" icing and potential thermal erosion could follow as the land slumps into "Thermokarst" terrain. The micro-relief pattern on the hummocky land surface is barely discernable on large-scale aerial photos used for timber surveys. ?

AND MICRO RELIEF

TABLE — EFFECTS OF DISTURBANCES ON DEPTH TO PERMAFROST, 1975

10"	MOSS UNDER BLACK SPRUCE, PERMAFROST AT 16"	(SITE 24)
	ADJACENT SCALPED AREA, PERMA. AT 36"	
15"	SPHAGNUM UNDER BLACK SPRUCE, PERMAFROST AT 19"	(SITE 110)
	ADJACENT SCALPED AREA, PERMA. AT >48"	
10"	SPHAGNUM UNDER BLACK SPRUCE, PERMAFROST AT 15"	(NEAR SITE 87)
	ADJACENT FIREBREAK CLEARING (JUNE '75), PERMA. AT 16"	(SITE 87)
	ADJACENT FIREBREAK SCALPING (JUNE '75), PERMA. AT 24"	(SITE 88)
5"	MOSS UNDER BLACK SPRUCE, PERMAFROST AT 20"	(SITE 47)
	ADJACENT RT.-OF-WAY CLEARING, PERMA. AT 36"	
10"	MOSS UNDER BLACK SPRUCE, PERMAFROST AT 21"	
	ADJACENT FIREBREAK CLEARING (JUNE '75), PERMA. AT 26"	(SITE 91)
9"	MOSS UNDER BLACK SPRUCE, PERMAFROST AT 13"	(SITE 45)
	ADJACENT BURN W/ 4" MOSS, PERMA. AT 20"	
7"	MOSS UNDER BLACK SPRUCE, PERMAFROST AT 26"	(SITE 57)
	ADJACENT BURN W/ 3" MOSS, PERMA AT >48"	
12"	MOSS UNDER MOIST TUNDRA, PERMAFROST AT 16"	(SITE 26)
	ADJACENT WETTER AREA, PERMA. WAS DEEPER	
	ADJACENT HIGHER AREA (MICRO RELIEF), PERMA. AT 8-10"	
9"	SPHAGNUM UNDER BLACK SPRUCE, PERMAFROST AT 20"	(SITE 51)
	ADJACENT WETTER AREA, PERMA. AT >48	
10"	MOSS UNDER BLACK SPRUCE, PERMAFROST AT 23"	(SITE 112)
	ADJACENT HIGHER AREA (MICRO RELIEF), W/ 8" MOSS, PERMA. AT 16"	(SITE 113)
12"	MOSS EXPOSED TO SUN, PERMAFROST AT 22"	(SITE 28)
	ADJACENT AREA UNDER SHADE, PERMA. AT 12"	
12"	MOSS UNDER OPEN BLACK SPRUCE, PERMAFROST AT 20"	(SITE 80)
	ADJACENT AREA W/ VEHICLE TRACKS, PERMA. AT 46"	

O.C.D.

12/18/75

SITE ROUTINGS	LANDFORM GROUP	SOIL DRAINAGE	VEGETATION	ORGANIC HORIZONS		MINERAL HORIZONS MAJOR DIFFERENTIATING CHARACTERISTICS	
				TYPE	THICKNESS		
					AVER.	RANGE	
32, 33, 60	HILLSLOPES	POORLY	BIRCH-ALDER- WILLOW THICKETS	SPHAG.	13"	10-14"	STONY, GRAVELLY LOAMS
3, 8, 99	"	"	"	"	12"	10-14"	DARK BROWN SILT LOAM OVER PL GRAYISH SPLOTCHED GRAVELLY LOWER PORTION SATURATED
5, 46, 103	FOOTSLOPES	SOMEWHAT POORLY	BLACK SPRUCE	MOSS	8"	4-12"	DARK GRAYISH SILT LOAM, FRIABLE
7, 8, 101, 109	"	POORLY	"	SPHAG.	12"	9-14"	DARK GRAY BROWN SILT LOAMS OVER SPLOTCHED WITH GRAY-OLIVE, SILT FRIABLE; LOWER PORTION SATURATED
9, 1, 93	"	"	"	"	8"	6-8"	DARK BROWN TO BLACK SILT LOAMS OR SLIGHTLY PLASTIC, SPLOTCHED GR BROWNS, SILT LOAMS; LOWER PORTION
4, 85, 86	"	VERY POOR	" (MUSKEG)	"	19"	7-27"	(BROWN MOSS MATERIALS OVER DECOMPOSED ORGANICS)
2	ALLUVIAL FANS	SOMEWHAT POORLY	BLACK & WHITE SPRUCE	MOSS	5"		GRAYISH, FRIABLE GRAVELLY FINE SANDY
115, 116	"	VERY POOR	BLACK SPRUCE	SPHAG.	14"		(PARTIALLY AND WELL DECOMPOSED AND SEDGE MATERIALS; SLIGHTLY SILTY; LOWER PORTION SATURATED)
12, 11	HIGH TERRACES	SOMEWHAT POORLY	BLACK, WHITE SPRUCE	MOSS	6"		GRAYISH, FRIABLE VERY FINE SANDY LOAM AND/OR SILT LOAMS
57	"	POOR	BLACK SPRUCE	"	5"		BLACK SILT LOAM OVER SPLOTCHED, M PLASTIC SILT LOAMS
	"	"	OLD FIELD	"	6"		GRAYISH BROWN SILT LOAM OVER SPLOT MOTTLED PLASTIC, SATURATED SILTY LOAM

FICS	FROZEN LAYER		SOIL EROSION POTENTIALS			REMARKS	
	DEPTH TO		THERMOKARSTIC	NON THERMO-	SHEET		
	AVGR.	RNGE.	SURFACE	GULLYING	KARST GULLYING	WASH	
	13"	10-14"	FROZEN ORGANICS W/ MUCH VISIBLE ICE	LOW		MOD.	PERMAFROST NOT LOCATED IN ONE SITE DUE TO STONINESS
IC						HIGH	
7M)	26"	14-26"	FROZEN GRAV. LOAM W/ LITTLE VISIBLE ICE	LOW			PERMAFROST BELOW 40" IN ONE OF THE THREE SITES
	16"	13-20"	FROZEN SIAT LOAM W/ VISIBLE ICE	HIGH		HIGH	ONE SITE GULLIED, ONE BURNED
WA							
DAMS,	21"	16-24"	FROZEN SILT LOAM W/ VISIBLE ICE	MOD.		HIGH	NO GULLIES FOUND ON THIS UNIT BUT IS RATED MOD. BY ASSOCIATION.
ED							
	24"	22-29"	LITTLE TO MUCH VISIBLE ICE; SOME KARST-LIKE.	HIGH		MOD.	SMALL CHANNEL (POLYGON) LOCATIONS; THERMAL COLLAPSE OBSERVED ON ONE SITE.
AT.							
L	19"	7-27"	FROZEN ORGANICS W/ MUCH VISIBLE ICE	LOW		LOW	ALL SITES ON LOWER FOOT-SLOPE EDGES
AM	>36"		NOT OBSERVED	LOW	LOW	LOW	A VERY PERMEABLE SOIL ON A GENTLE SLOPE
S	14"		MUCH FINE ICE VISIBLE	LOW		LOW	SITES ON LOWER EDGES OF THE FANS
ED,							
	>48"		NOT OBSERVED	LOW	LOW	LOW	NEARLY FLAT SURFACE
LED	26"		LITTLE OR NO FINE ICE VISIBLE	LOW		LOW	
D,	>40"		NOT OBSERVED	LOW	LOW	LOW	
Y.							

SITE ROWINGS	LANDFORM GROUP	SOIL DRAINAGE	VEGETATION	ORGANIC HORIZONS		MINERAL HORIZONS	
				TYPE	THICKNESS	MAJOR DIFFERENTIATING CHARACT	
					AVG.	RNGE.	
13, 73	HIGH TERRACES	POOR	BLACK, WHITE SPRUCE	FEATHER	6"		GRAYISH BROWN SILT LOAM OVER SP MOTTLED, PLASTIC SILTY CLAY LO
3	LAKE BED PLAINS	POOR	BLACK SPRUCE	MOSS	3"		DARK GRAY, MOTTLED CLAY; VERY P
0	TERRACES, RIVER	WELL	ASPEN-BIRCH- SPRUCE	LITTER	1"		BROWNISH LOAMY SANDS OVER YELLOW LOAMY FINE SANDS
25	"	"	SPRUCE-ASPEN	"	2"		BROWNISH GRAVELLY LOAMS & SILT LOA
4, 64	"	POOR	BLACK SPRUCE	MOSS	12"		GRAYISH, FRIABLE GRAVELLY SILT LO
69	"	SOMEWHAT POORLY	BLACK SPRUCE	FEATHER	6"		GRAYISH, FRIABLE SILT LOAM OVER GRA GRAVELLY SANDS
9, 79, 12, 113, 17		POORLY	BLACK SPRUCE	"	10"	5-15"	DARK GRAY TO BLACK SILT LOAMS OVER GRAYISH, SPLOTCHED FRIABLE SILT
0, 5, 80, 94, 96	LOW TERRACES, SECOND BOTTOMS, LOWER VALLEY SIDE SLOPES	POORLY	BLACK SPRUCE	"	8"	4-12"	BLACK SILT LOAMS OVER SPLOTCHED, ME SILT LOAMS, FRIABLE
5	"	"	"	"	3"		GRAYISH, MOTTLED FRIABLE SILT LOAM MOTTLED, SPLOTCHED SLIGHTLY PL SILT LOAM
9, 114	"	"	"	"	10"	7-14"	BROWNISH, SPLOTCHED FRIABLE SILT LOAMS GRAYISH, SPLOTCHED, SLIGHTLY PLAS SILT LOAMS; LOWER PORTION SAT
104, 105	"	"	"	SPHAG.	14"	14-15"	DARK BROWNISH GRAY, FRIABLE SILT LOAM GRAYISH, MOTTLED SILT LOAMS

TIC	FROZEN LAYER		SOIL EROSION POTENTIALS			REMARKS
	DEPTH TO AVER. ENGE.	CHARACTER OF SURFACE	THERMOEROSION GULLYING	NON THERMOEROSION GULLYING	SHEET WASH	
NEA	25"	NOT OBSERVED DUE TO STANDING WATER	LOW		LOW	NEARLY FLAT SURFACE
TIC	740"	NOT OBSERVED	LOW	LOW	LOW	NEARLY FLAT; OLD BURN
W.	748"	NOT OBSERVED		LOW	LOW	LOW RATINGS BASED ON HIGH INFILTRATION CAP. & GENTLE SLOP
	748"	NOT OBSERVED		LOW	LOW	RATINGS BASED ON GRAVEL CONTENT & GENTLE SLOPES
IS	748"	NOT OBSERVED		LOW	MOD.	
"	26"	SMALL AMOUNT OF VISIBLE ICE	LOW		LOW	
45	20" 15-26"	SMALL AMOUNT OF VISIBLE ICE (EST. 1/3 BY VOL. AND LESS)	MOD		LOW	DUE TO TOPOGRAPHIC POSITION, THIS UNIT RECEIVES LESS SEEP AGE THAN THE MORE HAZARDOUS FOOTSLOPES.
ED	21" 15-29"	SMALL TO LARGE AMOUNTS OF ICE	HIGH		LOW	
NEA	748"	NOT OBSERVED	HIGH		MOD	GULLY DEVELOPING FROM A COLLAPSE RELATED TO GROUND ICE MELTING. BURNED AREA.
TR	18" 14-22"	MUCH TO LITTLE ICE VISIBLE			LOW	
TER						
NEA	19" 17-21"	MUCH FINE ICE VISIBLE			LOW	

SITE GROUPINGS	LANDFORM GROUP	SOIL DRAINAGE	VEGETATION	ORGANIC HORIZONS		MINERAL HORIZONS MAJOR DIFFERENTIATING CHARACT
				TYPE	THICKNESS	
					AVER. RANGE.	
13, 73	HIGH TERRACES	POOR	BLACK, WHITE SPRUCE	FEATHER	6"	GRAYISH BROWN SILT LOAM OVER SI MOTTLED, PLASTIC SILTY CLAY LO
8	LAKEBED PLAINS	POOR	BLACK SPRUCE	MOSS	3"	DARK GRAY, MOTTLED CLAY; VERY T
10	TERRACES, RIVER	WELL	ASPEN-BIRCH- SPRUCE	LITTER	1"	BROWNISH LOAMY SANDS OVER YELLOW LOAMY FINE SANDS
15	"	"	SPRUCE-ASPEN	"	2"	BROWNISH GRAVELLY LOAMS & SILT LO
4, 64	"	POOR	BLACK SPRUCE	MOSS	12"	GRAYISH, FRIABLE GRAVELLY SILT L
69	"	SOMEWHAT POORLY	BLACK SPRUCE	FEATHER	6"	GRAYISH, FRIABLE SILT LOAM OVER GR GRAVELLY SANDS
10, 7, 112, 113, 47		POORLY	BLACK SPRUCE	"	10"	5-15" DARK GRAY TO BLACK SILT LOAMS OVER GRAYISH, SPLOTCHED FRIABLE SILT
50, 80, 94, 106	LOW TERRACES, SECOND BOTTOMS, LOWER VALLEY SIDE SLOPES	POORLY	BLACK SPRUCE	"	8"	4-12" BLACK SILT LOAMS OVER SPLOTCHED, H SILT LOAMS, FRIABLE
75	"	"	"	"	3"	GRAYISH, MOTTLED FRIABLE SILT LOAM MOTTLED, SPLOTCHED SLIGHTLY. P SILT LOAM
96, 114	"	"	"	"	10"	7-14" BROWNISH, SPLOTCHED FRIABLE SILT LOAMS GRAYISH, SPLOTCHED, SLIGHTLY PLAS SILT LOAMS; LOWER PORTION SPT
104, 105	"	"	"	SPHAG.	14"	14-15" DARK BROWNISH GRAY, FRIABLE SILT LOAM GRAYISH, MOTTLED SILT LOAMS

TABLE 2. INTERPRETIVE

TABLE 2. INTERPRETIVE						
COLUMN 1 SITE ROUTINGS	2 LANDFORM GROUP	3 SOIL DRAINAGE	4. VEGETATION	5 ORGANIC HORIZONS		7 MINERAL HORIZONS MAJOR DIFFERENTIATING CHARACTER
				TYPE	THICKNESS	
					AVER. RANGE.	
19, 21, 22, 3, 24	HIGH ELEV. SLOPES & RIDGES	WELL	ALPINE TUNDRA	MOSS	6" 1-14"	BROWNISH, GRAVELLY LOAMS, USUAL SCHIST BEDROCK AT REL. SHAL DEPTHS - ESTIMATED TO BE 2'
3	"	SOMEWHAT POORLY	"	"	20"	(DARK BROWN, WELL DECOMPOSED IC LAYER W/ NUMEROUS SMALL SCHIST FRAGMENTS; SLIGHTLY :
76, 01	HILLSLOPES	WELL	BLACK, WHITE SPRUCE	FEATHER	5" 5"	DARK BROWN SILT LOAMS OVER BROWN SILT LOAMS
59, 61, 77, 81, 82, 117	"	WELL	BLACK SPRUCE	"	6" 4-13"	BLACK SILT LOAM (THIN OR MAY BE OVER FRIABLE BROWNISH SILT OVER SPLOTTED, FRIABLE GRAVELLY STONY SILT LOAMS OR LOAMS
30	"	WELL	ASPEN	LITTER	<1"	DARK BROWN SILT LOAM OVER BROWN LOAM OVER YEL. BROWN SANDY, WEA
40	"	SOMEWHAT POORLY	BLACK SPRUCE	MOSS	9"	DARK BROWN, FRIABLE SILT LOAM;
39	"	MOD. WELL	"	"	10"	GRAYISH FINE SANDS; LOOSE, MOIST
97	"	SOMEWHAT POORLY	"	"	4"	THIN BLACK SILT LOAM OVER BROWNISH SILT LOAM OVER GRAVELLY, STONY THE LOWER PORTION OF WHICH IS SL PLASTIC AND SATURATED.
70	"	POORLY	"	FEATHER	18"	(ORGANICS - INTERLAYERED DECOMPOSED MATERIALS)
78, 1	"	"	"	SPHAGNUM	11" 6-15"	BROWNISH, FRIABLE SILT LOAMS OR GRA

CRUICKS FOR APPRAISING SOIL EROSION POTENTIALS

8 FROZEN		9 LAYER	10 SOIL EROSION POTENTIALS			13 REMARKS
5 DEPTH TO		CHARACTER OF SURFACE	THERMOKARSTIC GULLYING	NON-THERMO- KARST GULLYING	12 SHEET WASH	
VER.	RNGE.					
ONLY	15"	6-24"	FROZEN SOIL W/ LITTLE OR NO VISIBLE ICE	LOW	MOD.	ROCK MATERIAL KEEPS GULLY EROSION POTENTIALS LOW.
AN-	20"		NOT OBSERVED	LOW	LOW	SOLIFLUCTION LOBE; SOIL MOVES NATURALLY AS A SLOW FLOW.
)	34"		NOT OBSERVED		HIGH	LOESS READILY GULLIED BY CHANNELIZED RUNOFF
F)	36"		NOT OBSERVED		MOD.-LOW	HALF OF THESE SITES HAVE GRAVELS AND/OR STONE AT 6" OR LESS UNDER SILTS; OTHER AT 12-15"
S	38"		NOT OBSERVED		HIGH	GRAVELS ARE FINE SIZE AND DO NOT RESTRICT CUTTING TOO WELL
LY	1"		FROZEN SILT LOAM W/ LITTLE ICE	MOD.	HIGH	ON A 20% SLOPE.
NITE	30"		FROZEN SAND W/ LITTLE VISIBLE ICE	LOW	HIGH	A SAND-BLANKETED LOWER MOUNTAIN SLOPE.
	36"		PROBED ONLY, NOT OBSERVED	LOW	HIGH	GRAVELLY SOILS CAN BE PROBED WHEN SATURATED
	12"		FROZEN ORGANICS W/ ICE LITTLE OR NO VISIBLE	LOW	LOW(?)	NOT TOO CERTAIN OF THE LOW SHEET WASH RATING ORGANIC SOIL IS ON A 55% SLOPE.
	18"	10-26"	FROZEN SILT LOAM W/ ICE CRYSTALS & VEINS	LOW	HIGH	

COLUMN 1 : SITE GROUPINGS — LISTED ARE THE SITE NUMBERS AS SHOWN IN TABLE 1, F

2 : LANDFORM GROUP — THE 31 LANDFORM DESIGNATIONS IN TABLE 1 ARE HERE C

3 : SOIL DRAINAGE — FOLLOWS THE DEFINITIONS IN USDA SOIL SURVEY MANUAL, ABR

WELL-DRAINED soils are nearly free from mottling and are common

MODERATELY WELL-DRAINED soils commonly have a slowly perme

SOMEWHAT POORLY DRAINED soils are wet for significant periods

POORLY DRAINED soils are wet for long periods and are b

VERY POORLY DRAINED soils are wet nearly all the time. Depre

4 : VEGETATION — PATTERNED AFTER THE FOREST TYPES ^{USED} IN ALASKA TREES & SHR

5 : ORGANIC HORIZONS, TYPE — CONSISTS OF THE GROUND COVERS AND INDICATED AS MOSS (

6 : ORGANIC HORIZONS, THICKNESS — MEASURED FROM MOSS SURFACE TO MINERAL SOIL

7 : MINERAL HORIZONS, MAJOR DIFFERENTIATING CHARACTERISTICS — BRIEF NOTATIONS FOR

8 : FROZEN LAYER, DEPTH TO — SHOWN IS THE DEPTH FROM THE MOSS (OR WHATEVER)

9 : FROZEN LAYER, CHARACTER OF SURFACE — GIVEN HERE ^{IS} A. BRIEF DESCRIPTION

10 : SOIL EROSION POTENTIALS — THIS TERM REFERS TO THE SUSCEPTIBILITY OF A SOIL

OF SOIL ERODIBILITY AND SLOPE AND CLIMATIC CHARACTE

(10) THERMOKARSTIC GULLYING — THAT FORM OF GULLY DEVELOPMENT

INCLUDE "HIGH", "MODERATE" AND "LOW". RATINGS

DEVELOPMENT. A RATING OF "HIGH" IS APPROX

(11) NON-THERMOKARST GULLYING — THAT FORM OF GULLY DEVELOPMENT

TO THOSE SOILS NOT HAVING NEAR-SURFACE P

(12) SHEET WASH — SURFACE EROSION OR SHEET EROSION.

13 : REMARKS — FREQUENTLY AN EXPLANATION

DATA SUMMARY

NEED INTO 12 PRINCIPAL GROUPS

ED AS FOLLOWS:

or intermediate texture.

layer in or immediately beneath the column; have mottling in the lower B and C horizons. some soils commonly have mottling at a depth below 6 to 16 inches of clay and generally mottled from surface downward sites or level, frequently ponded. With or without mottling.

ENTIFIED OR MIXED), FEATHER(MOSSES), SPHAGNUM(MOSSES), LICHENS, LITTER.

UCIPAL HORIZONS (USUALLY SURFACE & SUBSOIL, SOMETIMES ALSO SUBSTRATUM)

FACE TO THE ABRUPTLY ENCOUNTERED FROZEN SOIL (USUALLY PERMAFROST) THE ICE (OR LACK THEREOF) IN THE FIRST INCH OR INCHES OF THE FROZEN MATERIAL.

WHEN BARED OF THE MOSS OR LITTER COVER, TO ERODE. THE POTENTIAL IS A FUNCTION TIC. SOMETIMES REFERRED TO AS THE "INHERENT SOIL EROSION HAZARD".

IT IS INITIATED BY SOIL COLLAPSE FOLLOWING MELTING GROUND ICE. THE RATING TERMS E BASED ON PATTERN RECOGNITION TECHNIQUES BUT REPRESENT CHANCES FOR GULLY NG A 50-50 CHANCE; "LOW" IS PROBABLY LESS THAN 1 CHANCE IN 10. (ALL CHANCES FOR CLEARINGS YA IS INITIATED SIMPLY BY RUNOFF, USUALLY CHANNELIZED. RATINGS GIVEN ONLY AFROST.

SITE REV. NOS.	LANDFORM GROUP	SOIL DRAINAGE	VEGETATION	ORGANIC HORIZONS			MINERAL HORIZONS MAJOR DIFFERENTIATING CHARACTER
				TYPE	THICKNESS		
					AVER.	RANGE.	
5	LOW TERRACES - SECOND BOTTOMS - LOWER VALLEY SLOPES	POOR	BLACK SPRUCE	MOSS	9"		BLACK SILT LOAM OVER EXTREMELY MOTTLED SILT LOAM
37	VALLEY BOTTOMS & ALLUVIAL LOWLANDS	WELL	ASPEN-COTTON- WOOD	LITTER	1"		DARK GRAY BROWN SILT LOAM OVER FRIABLE SILT LOAM
18, 42	"	"	BL. & WH. SPRUCE	MOSS	7"	3-10"	GRAYS SPOTCHED SILT LOAMS AND V. E. SANDY LOAMS OVER GRAVELS
8, 75, 90	"	SOMEWHAT POORLY	BLACK SPRUCE	FEATHER	11"	10-12"	BROWNISH OR GRAYISH, FRIABLE SILT L
2, 6	"	"	MOIST TUNDRA	LICHENS	4"		BROWNISH GRAVELLY LOAM OVER GRAY BR PLASTIC GRAVELLY, COBBLY CLAY LOWER HORIZON SATURATED
2	"	POORLY	" "	MOSS	12"		DARK GRAY BROWN SILT LOAM; FRIABLE
3, 63	"	"	" "	"	10"		GRAYISH SILTY CLAY, PLASTIC; SATU.
4	"	"	BLACK SPRUCE	FEATHER	5"		BLACK SILT LOAM OVER PLASTIC, MOTTLED SILT LOAM, SATURATED LOW
1, 65, 27	"	"	"	MOSS	12"	5-18"	GRAYISH SILT LOAMS
51	FLOOD PLAINS (TRIB. STREAMS)	POORLY	BLACK SPRUCE	SPHAG.	9"		BLACK SILT LOAM OVER MOTTLED SILT
49	"	VERY POORLY	OLD FIELD	MOSS	4"		GRAY MOTTLED, PLASTIC SILT LOAM
7, 8, 66, 67, 68, 9	FLOOD PLAINS (MAJOR RIVERS)	POORLY	BLACK SPRUCE - BURNED AND UNBURNED	SPHAG & FEATHER	25"	17-34"	(FRESH, PARTIALLY, WELL DECOMPOSED MOSS WOODY MATERIAL W/ SANDY, SILTY SE
	DOGS	VERY POOR	BLACK SPRUCE	SPHAG.	23"		PARTIALLY DECOMPOSED SPHAG. AND SEDGE

FROZEN LAYER			SOIL & EROSION POTENTIALS			REMARKS
ICS	DEPTH TO	CHARACTER OF	THERMOKARSTIC	NON THERMO-	SHEET	
	AVER. R _{NGE}	SURFACE	GULLYING	KARST GULLYING	WASH	
TONY	>16"	NOT OBSERVED	LOW	LOW	LOW	NEARLY FLAT SLOPE AND STONINESS MAKES FOR LOW RATIO
IN	>40"	NOT OBSERVED	LOW	LOW	HIGH	UPON CLEARING, THIS AREA DEVELOPED A PRONOUNCED MOUND & CHANNEL RELIEF BUT NO GULLIES
FINE	>30"	NOT OBSERVED		MOD. TO LOW	LOW	GRAVEL WOULD LIKELY LIMIT ANY GULLY CUTTING TO SHALLOW DEPTHS
IS	18"	14-22" LITTLE FINE ICE VISIBLE	HIGH		HIGH	THIS IS THE "MOUND" PORTION OF SOME POLYGONS. INTIMATELY ASSOCIATED w/ #74, 92.
U	>48"	NOT OBSERVED		LOW	LOW	
WET	16"	LITTLE FINE ICE VISIBLE	LOW		LOW	NEARLY FLAT AREA
ED	>42"	NOT OBSERVED	LOW		LOW	NEARLY FLAT
PER	18"	MASSIVE KARST-LIKE ICE BODIES	HIGH		HIGH	APPEARS TO BE A POLYGON CHANNEL.
	15"	12-18" MUCH FINE ICE	MOD.		HIGH	ONE SITE VERY HUMMOCKY.
AM	20"	LITTLE FINE ICE	LOW		LOW	
AT	>46"	NOT OBSERVED		LOW	LOW	
D	25"	17-34" MUCH FINE ICE VISIBLE	LOW		LOW	
ENT						
RIAL	23"	MUCH FINE ICE	LOW		LOW	

SITE ROWINGS	LANDFORM GROUP	SOIL DRAINAGE	VEGETATION	ORGANIC HORIZONS		MINERAL HORIZONS MAJOR DIFFERENTIATING CHARACTER	
				TYPE	THICKNESS		
					AVER.		RANGE.
5	LOW TERRACES - SECOND BOTTOMS - LOWER VALLEY SLOPES	POOR	BLACK SPRUCE	MOSS	9"		BLACK SILT LOAM OVER EXTREMELY MOTTLED SILT LOAM
37	VALLEY BOTTOMS & ALLUVIAL LOWLANDS	WELL	ASPEN-COTTON- WOOD	LITTER	1"		DARK GRAY BROWN SILT LOAM OVER FRIABLE SILT LOAM
38, 42	"	"	BL. & WH. SPRUCE	MOSS	7"	3-10"	GRAY SPOTCHED SILT LOAMS AND VERY SANDY LOAMS OVER GRAVEL
8, 75, 90	"	SOMEWHAT POORLY	BLACK SPRUCE	FEATHER	11"	10-12"	BROWNISH OR GRAYISH, FRIABLE SILT L
2,	"	"	MOIST TUNDRA	LICHENS	4"		BROWNISH GRAVELLY LOAM OVER GRAY OR PLASTIC GRAVELLY, COBBLY CLAY LOWER HORIZON SATURATED
	"	POORLY	" "	MOSS	12"		DARK GRAY BROWN SILT LOAM; FRIABLE
3, 63	"	"	" "	"	10"		GRAYISH SILTY CLAY, PLASTIC; SATU
4	"	"	BLACK SPRUCE	FEATHER	5"		BLACK SILT LOAM OVER PLASTIC, MOTTLED SILT LOAM, SATURATED LOW
6, 65, 27	"	"	"	MOSS	12"	5-18"	GRAYISH SILT LOAMS
51	FLOOD PLAINS (TRIB. STREAMS)	POORLY	BLACK SPRUCE	SPHAG.	9"		BLACK SILT LOAM OVER MOTTLED SIL
49	"	VERY POORLY	OLD FIELD	MOSS	4"		GRAY MOTTLED, PLASTIC SILT LOAM
7, 8, 66, 67, 68, 19	FLOOD PLAINS (MAJOR RIVERS)	POORLY	BLACK SPRUCE - BURNED AND UNBURNED	SPHAG & FEATHER	25"	17-34"	(FRESH, PARTIALLY, WELL DECOMPOSED MOSS WOODY MATERIAL W/ SANDY, SILTY SE
...	DOGS	NEARLY POOR	BLACK SPRUCE	SPHAG.	23"		PARTIALLY DECOMPOSED SPHAG. AND SEDGE

SOIL EROSION POTENTIALS

A reconnaissance was conducted on wildlands within the discontinuous and sporadic permafrost areas of Interior Alaska. One of the principal purposes was to appraise soil erosion potentials or hazards in general and thermokarst-initiated gully development in particular. As used here, thermokarst-initiated gully development potential refers to the susceptibility of an area to develop, first, karst-like ground features through rapid thawing of the near-surface permafrost and secondly, with the aid of running water, further develop the thermokarst features into active, down-cutting gullies. Because in brief periods of time some gullies having thermokarst origins have reached alarming proportions and because the prospects for exposing the near-surface permafrost to rapid thawing is constantly increasing, it is important that potentially critical soil erosion situations be recognized on the ground as soon as possible. The primary concerns of this field effort were the characterization and categorization aspects of this resource problem.

Field Methods. Hand shovels were used to dig sampling pits to expose the organic and mineral soil horizons for examination. Four foot long steel rods were used to probe the subsurface horizons in the vicinity of the sampling pits to determine variations in depth to specific horizons or materials (as identified in the pits) such as gravelly or stony materials, the permafrost table, contrasting textural changes, and so forth. Both disturbed and undisturbed sites were examined to learn apparent cause and effect relationships. Erosion problem areas were particularly sought out. Undisturbed, shovel-cut samples from a few selected sites were taken of the moss and upper soil horizons for moss and lichen identification and for more detailed examination of these materials.

For the most part, however, horizon properties and features were guided by standards of U.S.D.A. soil survey procedures [Agric. Handbook No. 18], with one exception-- that concerning the zero reference line for horizon measurements. For all soils, ground surface (i.e., top of the moss layer) was used as the zero reference. Among other things, this procedure eliminated the need for two zero references (one for mineral soils, another for organic soils) and probe measurements became directly compatible in all situations with pit measurements.

Thermokarst-Initiated Gullying. Early in the reconnaissance, observations and reports from others indicated that most of the wildland soils are well protected from water erosion by a thick, tough mat of mosses and lichens and that the most damaging soil erosion problems originate as thermal erosion. Péwé [9] noted that gullies form in silty soils on slopes where surface waters are channeled into pits initially formed by melting of ground-ice masses. Kellogg and Nygard [7] stated that: "Special kinds of gullies are initiated by the melting of ice blocks in permafrost. Although such gullies superficially resemble ordinary gullies, little or no soil material flows from them. Yet if the contour of the land is such that surface runoff does get concentrated in these gullies, they may deepen and become ordinary gullies".

Several other investigators have reported on subsidence-thaw problems and the development of thermokarst features or topography [5,6,11,22] but soil subsidence is not equated with soil erosion per se. Soil subsidence may lead to soil erosion but collapse in itself does not meet the usual definitions of soil erosion.

Several "Thermokarstic" gullies and the beginnings of such gullies were examined in the field. Because of their value in appraising this soil erosion category, each is briefly described here, and is supplementary to the field data Table:

note in
handbook
exactly as
in pg 27

(1) N. GOLDSTREAM GULLY (near Standard) on Alaska RR. MP-439.

This large gully had its beginnings in 1966 on a tractor-cleared firebreak, the clearing of which led to permafrost thawing and subsidence. Presently the gully is about 1.5 miles in length. A cross section near the lower end was estimated to be 20 feet deep and 25 feet wide at the ground surface. Because of bank slumping and deepening by water erosion, its cross section shape is roughly a V. The largest cross-sectional area is located near the mid-length position. At that point it is about 30 feet deep and 50 feet wide. Further upstream, the cross section becomes smaller again-- about 10 feet deep and 15 feet wide. Prominent cracks appear in the exposed mineral soil, cracks that run parallel to the gully's edges for much of its length. Bank collapse is common. Short side gullies and the beginnings of side gullies are in places oriented at right angles to the axis of the main gully.

The permafrost was examined under what appeared to be a polygon channel at a location some 10 feet back from the gully's edge (refer to site #74) in the vicinity of the lowest cross section mentioned above. At 18 inches below the surface of the ground, ice lenses and ice masses were exposed. The ice masses were irregularly shaped but their surfaces were smooth, hard, and rounded. Depths to various portions of the karst-like surfaces varied from 18 inches to 30 inches and more. At one point, between adjacent ice lobes that were about 6 inches apart, was a void that measured 12 inches deep and extended horizontally another 12 inches before disappearing under one of the ice lobes. Another examination was made (refer to site #75) some 10 feet away, at a right angle to the channel in the polygon mound. Permafrost was at 18 inches but it contained no visible ice.

(2) S.GOLDSTREAM GULLY (near Ohio Creek) on Lumber Co. Road.

This gully developed in a black spruce burn of 1966 but appears not to have been otherwise disturbed (no firebreak). The age of the larger black spruce seedlings in the vicinity is about 5 years. It is not a long gully but several headcuts (a compactly branched system) are involved, each being about 6 feet deep and 6 feet wide. The gully edges are extremely irregular and moss mats or layers overhang the undercut portions. Some ground cracks are oriented at right angles to the edges of the gully but others are parallel. The landform upon which the gully has developed is a gently sloping (5%) north-facing valley slope of probable colluvial origin. (see site #55 for other details).

A firebreak had been bull-dozed in the vicinity at the time of the burn. The ground had been completely scalped of the moss mat but no portion of this firebreak has any evidence of degradation due to permafrost thaw, even though identical or at least similar soils, slope gradients, and aspects are involved. Apparently it is the presence of "ice-rich" permafrost in an old drainage channel that makes the difference.

(3) LOGGING CABIN CREEK GULLY (Chicken burn, Mt. Fairplay) Taylor Hwy.

Like the Goldstream gully, this one also developed on a tractor-cleared firebreak. The burn from Chicken to Mt. Fairplay occurred in 1966.^{1/} The gully length presently is estimated at about 100 yards. A lower cross section is about 10 feet deep and 25 feet wide. The maximum depth is about 20 feet which is reached at a point below the mid-length position. The gully walls are actively collapsing and enlarging its cross-sectional area. It is not likely, however, that its length will increase appreciably because the gully already crosses the entire foot-slope. The mouth of the gully levels out onto an alluvial meadow and the upper end the upper end is headcutting (very slowly) into a 20-30% hillslope that is underlain at shallow depths with schist bedrock. The footslope into which the gully has advanced has a slope gradient ranging between 5 and 10% and has a west aspect. The adjacent vegetation is an open, low-growing black spruce stand, under which an ice-rich, highly organic silt loam was encountered at 13 inches. (see site #45).

The volume of sediments that are deposited on the meadow are minor in relation to the volume represented by a gully of these proportions. Some of the sediments, of course, could have been washed downstream but, nevertheless, reports regarding the quick initial development of such gullies, lead one to accept the fact that rapid ground-ice melting played a critical role.

^{1/} Chicken Burn: 7/22/66 = 20,000 Ac.
8/02/66 = 200,000 Ac.
9/13/66 = 250,000 Ac.

(4) CUSHMAN CREEK (within the Wickersham Experimental Forest).

A relatively small gully-- averaging perhaps 2 feet deep, 4 feet wide, and about 100 feet long-- has developed in a bulldozer-cleared firebreak. The head of the gully has collapse characteristics-- irregular edges, steep walls with overhanging moss mats in places, although water erosion and time (Wickersham burn was on 6/25/71) are smoothing some of the original abruptness. Sediments are being water-transported to the creek valley bottom. The landform upon which this gully occurs is a colluvial footslope, is west-facing and has a gradient ranging from 8 to 12%. (refer to site #102).

^{Loot}
(5) HORSE CREEK (Washington Creek burn of June 1975)

A collapsed sink or pit has developed in a bulldozed firebreak on a 15% westerly-facing, colluvial footslope. The sink dimensions at the time of observation (Sept. 1975) were approximately 2.5 feet deep, 6 feet wide, and 10 feet long. Near one edge of the pit, permafrost was encountered at 22 inches with its frontal surface smoothly rounded and curving downward under the sink. The frozen silt loam contained many ice crystals and thin ice lenses. The adjacent ground surface was marked with many cracks. Smaller collapses or sinks occur at scattered intervals over the entire portion of firebreak on the footslope. (refer to site #92).

The permafrost under a slightly depressed polygon channel was examined in the unburned area adjacent (and below) the above described sink. Here, too, the frozen silt loam was encountered at 22 inches but varied considerably locally because of the karst-like character of the "ice-rich" frozen material. (see site #93).

These "benchmark" examples of thermokarst-related gullies occur on two landform groups but the soil complexes on both appear to be similar. In the N. Goldstream burn (Standard) and the S. Goldstream burn (Ohio Creek), gullies occur on broad, low gradient (4-5%), loess-blanketed valley slopes. Under polygon channel positions, the silt loam subsoils are mottled, slightly plastic to plastic, are saturated, and overlie karst-like massive ice. In the polygon mound positions, the silt loam subsoils are grayish and friable, are moist, and overlie frozen soil of the same kind. Logging Cabin Creek (Taylor Hwy. in Chicken burn), Cushman Creek and Horse Creek (Elliott Hwy. in Wickersham burn) gullies all occur on narrow footslopes with slope gradients varying from 5 to 20%. The silt loam subsoils are slightly plastic, mottled, saturated, and overlie karst-like ice masses or are friable, moist and overlie frozen grayish silt loam-- all depending on whether one is examining channel positions or mound positions. Perhaps instead of stating "mound" positions, a more accurate term may be "non-channel" positions since the mounds are indistinct. Attention is focused on the channels-- where they occur.

Both landform groups are believed to have much ground-ice in polygon patterns but, often as not, the polygons are poorly defined and difficult to detect. Furthermore, the polygons apparently occur in dispersed fashion. For example, on Goldstream burn it was observed that severe soil subsidence may or may not take place following thawing of the permafrost on lands that characteristically contain much ground-ice. Such lands, according to Frost [5], are of low topographic position, have thick silt loam soil mantles, and have a source of water. The Goldstream burn area has these criteria including the water source. Occupying a transitional position between the higher-lying hillslopes and the lower-lying creek bottoms, these soils receive seepage water and a plentiful build-up of ground-ice can be expected.

Aspect?
Areas similar to these examples, then, are given a "High" hazard or potential rating. Somewhat similar areas, either having most of the above characteristics or are closely associated with thermokarst conditions or have other significant characteristics so as to make them at least suspect, are given "Moderate" ratings. "Low" ratings are assigned to those sites that would appear to have little or no opportunity to develop thermokarst-initiated gullies.

Non-Thermokarst Gullying. An occasional gully was observed on firebreak areas constructed on soils not having permafrost or at least not having permafrost near to the surface.

Considering that firebreaks more frequently than not end up with a few tracks that catch and concentrate surface runoff, the hazard for purely fluvial gully development is real indeed on such areas.

Because of the widespread presence of soils with permafrost, most of the soils in this reconnaissance are not rated for this type of gully hazard. Those that are rated, however, were rated by the following guides:

High potential-- the deeper (more than 30") loessial or loess-capped soils on hillslopes. Because gullies can cut deeply, the severity of this problem is here the greatest.

Aspect?
Moderate potential-- medium depth (10-30") loessial or loess-capped soils on hillslopes and valley slopes with gradients as low as 4-5%. Mod.-severe limited to shallow depths.

Low potential-- less than 10" of silt loam over gravelly or stony, plastic horizons, or bed-rock, on flat lands. Rill stage only.

Sheet Erosion Potentials. Previous investigators have reported on the highly erodible nature of the loessial soils in Alaska and the severe water erosion hazards created when the protective moss cover is removed.[7,11,12,20] Observations of this reconnaissance are in accord with these appraisals. The silt loam--bordering on very fine sandy loam--soil surfaces are only weakly aggregated and when exposed, the aggregates are easily detached and transported by rainfall and surface runoff. Exceptions to this generality are the soils having gravelly and/or stony materials as the first mineral horizon, or very nearly so, the organic soils, and those on nearly flat surfaces where washing does not exert much of a transport force.

The previously discussed thermokarst-initiated gully erosion areas fall into two mapping units of the Exploratory Soil Survey of Alaska . The first mapping unit: $\frac{ICF}{2m} - \frac{IAHP}{1m}$

is described as an association occupying:

1/

"rolling to steep uplands in the Tanana Valley". ICF/2m is composed of well-drained, loamy, brown soils with lenses of fine grained materials and has no permafrost. The IAHP/1m component is composed of poorly-drained soils with peaty surface layers and has permafrost at shallow depths. These soils occur on footslopes and in valley bottoms; vegetation is black spruce forest or dominantly sedges and mosses; texture is silt loam. The Goldstream burn gullied areas would be included in this component, a component which makes up some 30% of the total area of the mapping unit.

The second mapping unit noted is: $\frac{ICT}{2g} - \frac{IAHP}{1m}$ which is described as an extensive association in: "hilly uplands of east central Alaska". The ICT/2g component is composed of well-drained brown soils, not having permafrost. The IAHP/1m component is composed of, again, poorly-drained soils with peaty surface layers and have permafrost at shallow depths; but in this mapping unit, these soils occur in valley bottoms, on long north-facing footslopes at lower elevations, and on rolling uplands at higher elevations. The Wickersham and Chicken burns would be included, broadly, in this component, a component which makes up some 25% of the total area of the mapping unit.

Thus, portions of components of certain mapping units of the Exploratory Soil Survey of Alaska can be recognized as having high potentials for thermokarstic gullies.

- 1/ The classification names of the above symbols are:
ICF/2m = Aeric Cryochrepts (2m = 12% slopes, med.text.)
IAHP/1m = Histic Pergelic Cryochepts (1m = 12%, " ")
ICT/2g = Typic Cryochrepts (2g = 12% slopes, very grav.)

AERIAL PHOTOS

(Interpretation of near-surface massive ground-ice in forests.)

A comprehensive report concerning the photo interpretation of soils and permafrost conditions in Alaska was prepared in 1950 by Purdue University for the Corps. of Engineers. [5] In it, the following statements appear:

1. One of the most significant features of permafrost regions in which detrimentally frozen soils abound is the presence of soil polygons.
2. Detrimentially frozen soils are those in which a large percentage of the soil mass is ice in the form of lenses, wedges, veins, or large masses of ground ice.
3. Polygons undoubtedly occur widespread throughout the timbered areas but are difficult to find because of the dense vegetation cover.

Following some examinations of soil polygons, or portions of soil polygons in relatively open-growing black spruce, an attempt was made to photo interpret the location of additional similar conditions near Fairbanks. Using available 1:12,000 photography, three timbered areas were studied and four locations were pin-pointed as possible portions of soil polygons. These were then field checked and the sites are described as #94, #95, #96, & #104 in Table

As it turned out, The channel (i.e., a polygon channel) at site #94 was a small ordinary drainage channel which was underlain with ice-rich permafrost at 16". At site #95, the channel was underlain with extremely stony material where ice could not be located. At site #96, the channel was one of a pair of vehicle tracks in an old trail; ice crystals were found in the frozen soil at 14". Site #104 was a hummocky area under which at 21" the ice lenses and crystals in the frozen soil were estimated to be somewhat less than 50% by volume.

These preliminary attempts were less than completely successful. However, interpretation of large-scale aerial photos appears to be possible.

1. Beikman, Helen M. Preliminary Geologic Map Alaska, USGS, 1974.
2. Brown, Rodger J.E. Permafrost in Canada, Univ. Toronto Press 1970
- ✓ 3. Dingman, S.L. Relations Among Vegetation, Permafrost...
 Jo. of Arctic-Alpine Research, 6:1, p.37-47 1974
4. Fairbridge, R.W. Encyclopedia Geomorphology, Reinhold 1968
5. Frost, Robert E. Evaluation of Soils and Permafrost...
 Vol.1-2, Engr. Exp. Sta., Purdue Univ., 1950
6. Hamelin, Louis E. Illustrated Glossary of Periglacial...
 Laval Univ. Press, Quebec 1967
7. Kellogg, C. E. Exploratory Study of Principal Soil
 Groups of Alaska, USDA Memo. No. 7 1951
8. Péwé, T. L. Geomorphology of Fairbanks Area, Alaska
 Stanford Univ. 1952
9. " Effects of Permafrost on Cultivated... 1954
 In Mineral Resources, 51-53, USGS Bul 989
10. Richard, W.E.W. Thaw and Erosion on Vehicular Trails..
 Slaughter, C.W. Jour. Soil Water Conserv., 28:6 1973
11. Rieger, Samuel Soil Survey, Fairbanks Area, Alaska,
 USDA Soil Survey Series 1959, No.25 1963
12. Schoephorster, D.B. Soil Survey, Salcha-Big Delta Area, AK.
 USDA Soil Survey Series 1973
13. Tricart, Jean Geomorphology Cold Environments... 1970
 McMillan
14. Tsyrovich, N.A. Bases and Foundations on Frozen Soil, 1958
 Highway Research Board, Spec. Report 58,
- ✓ 15. Viereck, L.A. Relationship of White Spruce to Lenses..
 Jour. Arctic Inst., 18:4 1965
16. " Soil Temperatures in River Bottom Stands..
 Proc. Helsinki Symp. 1970
- ✓ 17. " Forest Succession and Soil Development...
 Arctic-Alpine Research, 2:1, p.1-26 1970
18. " Alaska Trees and Shrubs, Ag. Handbk 410, 1972
19. " Ecological Effects of River Flooding.. 1973
 IN Permafrost: Nat. Acad. Sci.
20. " Wildfire in Taiga, Jour. Quat. Res. 3:3 1973
21. Washburn, A.L. Periglacial Processes, St. Martins Pr. 1973
22. Zoltai, S.C. Terrain, Vegetation, Permafrost...
 Pettapiece, W.W. Report 73-4, N. For. Res. Ctr., Edmonton 1973

1	2	3	4	5	6	7	8	9	10
LOCATION VICINITY	SITE NO.	LANDFORM	ELEV.	ASPECT	SLOPE SAND	DOMINANT VEGETATION	DEPTH PROFILE	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
EUREKA LODGE (GLENN H.A.)	1	HORRINE (RIDGE)	3420	SE	1%	DWARF BIRCH, WILLOW, BLUEBERRY (SHRUB THICKETS)	0-6" 5-8" 8-12"	MOSS AND LICHEN MAT, DECOMPOSED ORGANIC MATERIAL SILTY CLAY LOAM, (1/2"-3") GRAVEL-COBLES FROZEN ON (6/18/75)	SEE SITES #58 & #61 ON 9/16/75
GUNSLIGHT TAHNETA TOWER ROAD	2	STREAM VALLEY BOTTOM	3000	S	<5%	WILLOW, DWARF BIRCH, BLUEBERRY (MOIST TUNDRA)	0-2" 2-4" 4-22" 22-34"	FRESH, GROWING PORTION OF THE LICHEN (DWARF REINDEER) AND MOSS MAT; MATTED, PARTIALLY DECOMPOSED MOSS AND LICHEN MATERIAL; ROOTS MANY. BROWNISH GRAVELLY LOAM; TRIABLE, UNLAYERED STRUCTURE; ROOTS MANY. GRAY-BROWN, GRAVELLY, COBBLY, CLAY LOAM; FIRM, STICKY; FEW IF ANY ROOTS; SATURATED	NO FROZEN SOIL ENCOUNTERED TO THE DEPTH EXAMINED, 4/16/75; SEE SITE #62 FOR LATE SUMMER CONDITION.
"	3	"	3000	S	<5%	SEDGES (MOIST TUNDRA)	0-2" 2-8" 8-12" 12+"	FRESH GROWING PORTION OF THE MOSS (WITH SEDGES) MAT. MATTED, ONLY SLIGHTLY DECOMPOSED MOSS MATERIAL; ROOTS MANY. GRAYISH SILTY CLAY; FIRM, PLASTIC; SATURATED FROZEN SILTY CLAY; ICE CRYSTALS VISIBLE IN CHIPPED SAMPLE.	THIS SITE IS NEAR SITE #2 AND 1 TO 2 FT. LOWER IN ELEVATION. 4/15/75; SEE SITE #63 FOR LATE SUMMER GROWTH.
"	4	TERRACE	3050	E	2%	BLACK SPRUCE, WILLOW (OPEN, BLACK SPRUCE TYPE)	0-1" 1-5" 8-15" 15+"	FRESH, GROWING PORTION OF THE MOSS MAT. WELL DECOMPOSED ORGANIC MATERIAL; ROOTS ABUNDANT; SEE SITE #64 GRAYISH, SLIGHTLY GRAVELLY, COBBLY SILT LOAM; BECOMES FIRM IN LOWER PORTION FROZEN SOIL, ABRUPTLY ENCOUNTERED	SEE SITE #64 FOR LATE SUMMER CONDITIONS IN SAME AREA.
LAKE LINDS ROAD	5	FLAT-TOPPED UPLAND DIVIDE	2850	NEARLY LEVEL	1%	WILLOW, BERRY WHITE SPRUCE (NEAR TREELINE)	0-1" 1-5" 3-4" 4"	FRESH, GROWING PORTION OF THE MOSS AND LICHEN MAT. PARTIALLY DECOMPOSED MOSS AND LICHEN MATERIAL BROWNISH, GRAVELLY SANDY LOAM WATER STANDING ON HARD, UNIDENTIFIED (COBBLY, FROZEN?) MATERIAL	
LIBERTY FALLS (MR. CHITINA) EDGEMONT RD.	6	CREEK VALLEY BOTTOM	1175	E	<10%	BLACK SPRUCE, WILLOW, ALDER, LABRADOR TEA (OPEN B. SPRUCE)	0-1" 1-6" 6-11" 11+"	FRESH, GROWING PORTION OF THE MOSS MAT. PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS BLACK, WELL DECOMPOSED ORGANIC LAYER; SLIGHTLY SILTY; MATTED FROZEN ON LENSES SIMILAR TO LAYER ABOVE.	AREA IS MOUNDED - 4-5 FT. IN DIAMETER, 2-3 FT. HIGH. SHALLOW DRAINAGE CHANNELS ARE NOT FROZEN AT SAME DEPTH. 4/17/75. SEE SITE #65 FOR DETAIL.
LOWER TONGUE RIVER CROSSING	7	RIVER FLOOD PLAIN	615	NEARLY LEVEL	1%	BLACK SPRUCE (OPEN)	0-15" 15+"	INTERLAYERED PARTIALLY AND WELL DECOMPOSED ORGANICS AND SEDIMENTS. FROZEN ORGANIC MATERIAL - MOSTLY SPHAGNUM.	PROFILE SHOWS SOME EVIDENCE OF FLOODING, 6/11/75. SEE SITE #66.
"	8	"	615	NEARLY LEVEL	1%	BURNED (BLACK SPRUCE)	0-11" 11+"	SPHAGNUM MOSS PEAT LAYER WITH LENSES OF SANDS AND/OR SILT. FROZEN ORGANIC MATERIALS	FROZEN. GRAVEL WAS FOUND AT 18" IN A NEARBY WETTER, SHALLOW DRAINAGE CHANNEL. 4/19/75. SEE SITES #66, 67.

SITE	NAME	ELEVATION	DRAINAGE	SLOPE	VEGETATION	PROFILE	DEPTH	DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
1	TECHNICAL	1725	S.	<5%	BLACK, WHITE SPRUCE (CLOSED SPRUCE FOREST)	0-1 1/2" 1 1/2-6" 6"		FRESH, GROWING PORTION OF THE MOSS MAT (DOL. FEATHER MOSES) PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS. FROZEN SILT LOAM; ICE CRYSTALS AND VEINLETS VISIBLE	4/11/75. SEE SITE "69 FOR LATE SUMMER CONDITIONS.
10	TECHNICAL	1910	W.	<5%	BLACK, WHITE SPRUCE (OPEN SPRUCE TYPE)	0-3" 3-7" 9"		FRESH SPHAGNUM MOSS WELL-DECOMPOSED MOSS MATERIALS; MANY ROOTS FROZEN FINE SANDY LOAM; GRAY, SPLOTTED WITH REDDISH BROWN.	GLACIER SILT TO SMALL LENS. 4/9/75
11	HIGH	1910	W.	<2%	CLEARING; GROWING BACK TO CATTAILING WILLOW, ASH	0-6" 6-22" 22"		WELL-DECOMPOSED ORGANIC LAYER GRAYISH SILT LOAM; FRIABLE SPLOTTED, GRAYISH SILTY CLAY LOAM; PLASTIC, STICKY.	NO FOREST AT THIS DEPTH, 4/10/75.
12	"	1715	W.	<2%	BLACK, WHITE SPRUCE (OPEN SPRUCE FOREST)	0-4" 4-20" 20-26" 26"		NEARLY BLACK, PARTIALLY AND WELL-DECOMPOSED ORGANIC LAYER; MANY ROOTS. GRAYISH FINE/VERY FINE SANDY LOAM; SOIL NEARLY SATURATED GRAYISH SILT LOAM; SOIL NEARLY SATURATED FROZEN SILT LOAM.	4/11/75
13	"	1320	W.	<2%	BLACK SPRUCE, ASH CATTAILING, OCC. WHITE SPRUCE (CLOSED SPRUCE FOREST)	0-3" 3-6" 6-14" 14"		PARTIALLY DECOMPOSED MOSS LAYER NEARLY BLACK, WELL-DECOMPOSED ORGANIC LAYER; MANY ROOTS GRAYISH SILTY CLAY; PLASTIC AND STICKY FROZEN SILTY CLAY.	4/11/75
14	FOOTSLIPS	2300	S.E.	<5%	BLACK SPRUCE (OPEN, LOW GROWING)	0-4" 4-7" 7"		SPHAGNUM MOSS DECOMPOSED ORGANIC MATERIAL, DARK COLORED; MANY ROOTS FROZEN ORGANICS.	4/20/75
15	ROADSIDE	2000	W.	<2%	RIGHT-OF-WAY CLEARING; ORIG- INALLY BLACK SPR.	0-2 1/2" 2 1/2-14" 14"		PARTIALLY DECOMPOSED SEDGE AND MOSS MATERIALS GRAYISH SILT LOAM, BECOMING MOTTLED IN LOWER PORTION. FROZEN SILT LOAM.	4/20/75
16	"	2000	W.	<2%	BLACK SPRUCE, SEDGES (OPEN, LOW GROWING)	0-3" 3-14" 14"		FRESH AND PARTIALLY DECOMPOSED SEDGE AND MOSS MATERIALS GRAYISH, MOTTLED SILT LOAM FROZEN SILT LOAM.	ICE-RICH SILTS AT 8" AND AT 14" UNDER SEDGE-COVERED TRAIL WITHIN BLACK SPRUCE FOREST AREA. 4/10/75
17	STREAM	1950	W.	<2%	BLACK SPRUCE, WILLOW, BIRCH SEDGES (OPEN, LOW GROWING)	0-5" 5-6" 6"		BRIGHT YELLOW, ONLY PARTIALLY DECOMPOSED SPHAGNUM MOSS MAT. BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL FROZEN ORGANIC MATERIAL.	4/20/75

LOCATION, VICINITY	SITE No.	LANDFORM	ELEV.	ASP.	SLOPE GRAD	DOMINANT VEGETATION	PROFILE HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
TAYLOR HWY. MP-16, NEAR CAMP GRAND, WALKER FORK	18	STREAM VALLEY BOTTOM	1750	NEARLY LEVEL	<2%	BLACK, SPRUCE, WILLOW, LAB. TEA, (OPEN, LOW GROWING)	0-5" 5-7" 7"	PARTIALLY DECOMPOSED MOSS AND SEDGE LAYER; MANY ROOTS GRAYISH SILT LOAM FROZEN SILT LOAM	
TAYLOR HWY. MP-14Z	19	RIDGE SADDLE	3500	NEARLY LEVEL	<2%	DWARF BIRCH, WILLOW (ALPINE TUNDRA)	0-1" 0-10" 10"	MOSS MAT. GRAVELLY LOAM WITH SOME ROCK FRAGMENTS. FROZEN SOIL	FROZEN SOIL AT 15" IN NEAR-BY BUT SOMEWHAT WETTER SOIL 6/24/75.
EAGLE TOWNSHIP	20	TERRACE	1800	N.	<5%	ASPEN, PAPER BIRCH, W. and B. SPRUCE (QUAKING ASPEN TYPE)	0-1" 1-2" 2-8" 8-17"	LITTER - FRESH AND PARTIALLY DECOMPOSED LEAF AND ROOT MAT. LIGHT GRAY LOAMY FINE SANDS; MANY ROOTS. REDDISH-BROWN LOAMY FINE SANDS; FRIABLE; MANY ROOTS YELLOWISH-BROWN LOAMY FINE SANDS; FEW ROOTS.	
TAYLOR HWY. MP-105	21	RIDGE SADDLE	3500	E.	<5%	DWARF BIRCH, WILLOW (ALPINE TUNDRA)	0-5" 5-7" 7-15" 15"	MOSS MAT, PARTIALLY DECOMPOSED; MANY ROOTS DECOMPOSED ORGANIC MATERIAL (PEATY); MANY ROOTS. GRAVELLY LOAM; YELLOWISH-BROWN IN UPPER PORTION, YEL-GRAY IN LOWER; FROZEN GRAVELLY LOAM.	THIS PROFILE WAS LOCATED IN A DWARF BIRCH CLUMP. SOIL BETWEEN TWO CLUMPS HAD ONLY 1" TOTAL ORGANIC LAYER THICKNESS, CORRIES AT 12"; DEPTH TO FROST NOT DETERMINED.
BOUNDARY-EAGLE JUNCTION	22	RIDGE SIDESLOPE	3400	NW	15%	DWARF BIRCH, WILLOW (ALPINE TUNDRA)	0-2" 0-25"	MOSS MAT GRAVELLY, STONY LOAM	NO FROST ENCOUNTERED, 4/30/75
TAYLOR HWY. MP-91 JACK WADE	23	VERY STEEP LOWER HILL SLOPE	2500	N.	20%	DWARF BIRCH, WILLOW LAB. TEA (ALPINE TUNDRA)	0-6" 6"	MOSS MAT INCLUDING FRESH, PARTIALLY, AND WELL-DECOMPOSED LAYERS; MANY ROOTS FROZEN GRAVELLY STONY LOAM	A 1/2" LAYER OF SOIL ICE RESTED ON THE FROZEN SOIL LAYER (BETWEEN 6" AND 6 1/2"). 6/24/75. MICRORELIEF HUMmockY AND STAIR-STEPPED. DEPTH MEASUREMENTS MADE PERPENDI- CULAR TO SLOPE TOP, SHADING A FACTOR.
STEESE HWY 12 MI. SUMMIT	24	HILLSLOPE, SHOULDER PO- SITION	3100	N.	5%	B. SPRUCE, WILLOW, BLUEBERRY (OPEN, LOW-GROWING)	0-10" 10-16" 16"	MOSS LAYER; MANY ROOTS. GRAYISH FINE SANDY LOAM; FRIABLE FROZEN SOIL	FROZEN SOIL ENCOUNTERED AT 36" IN ADJACENT ROADWAY SCALPED AREA. 7/21/75
CIRCLE NAT SPRINGS	25	TERRACE	900	NEARLY LEVEL	>2%	W. SPRUCE, ASPEN (CLOSED)	0-2" 2-24"	LITTER MAT WITH TREE ROOTS UP TO 1/2" DIA. BROWNISH, GRAVELLY LOAM WITH LUPINES AND PACKETS OF SILT LOAM; MATERIAL	NO FROST TO 34", 7/21/75
	26	STREAM VALLEY BOTTOM	500	NEARLY LEVEL	>2%	WILLOW, GRASS, SEDGE (MOIST TUNDRA)	0-12" 12-16" 16"	DARK BROWN ORGANIC SURFACE LAYER (PEATY); MANY ROOTS HIGHLY ORGANIC SILTS; MANY ROOTS FROZEN GRAY-BROWN SILT LOAM.	POORLY DRAINED SITE. FROST WAS DEEPER IN THE WET STRAINERS AND SHALLOWER IN THE HIGHER (MICRORELIEF) WILLOW CLUMPS - 8" TO 12" TO FROZEN GRASS.

LOCATION VICINITY	SITE No.	LANDSCAPE	ELEV.	ASPECT	SLOPE GRAD.	DOMINANT VEGETATION	URGENT VARIANTS	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
STEESE HWY. MP-14.5	27	ALLUVIAL FLAT, LOWLAND AREA.	750	ASPECT LEVEL	42%	BLACK SPRUCE (SEMI-OPEN)	0-2" 2-6" 6-12" 12"	FRESH, GROWING PORTION OF THE MOSS (DAN. FEATHER TYPES) MAT. PARTIALLY DECOMPOSED MOSS MATERIAL; CONTAINS MANY WOODY AND GRASS ROOTS WELL MIXED, PARTIALLY DECOMPOSED MOSSES, WOODY MATERIAL, CONE SCALES, MANY FINE ROOTS, SPONGY; PH: 5.0 FROZEN GRAY SILT LOAM; THIN ICE LENSES VISIBLE.	
STEESE HWY. MP-15.4	28	SLIGHTLY ELEVATED FLAT (TERRACE?)	1100	NEARLY LEVEL	42%	B. SPRUCE, ALDER, WILLOW, LAB. TEA (OPEN, LOW-GROWING B. SPRUCE FOREST)	0-12" 12-22" 22"	MOSS LAYERS GRAY SILT LOAM FROZEN SILT LOAM	THIS SITE IS EXPOSED TO DIRECT SUNLIGHT; AN ADJACENT SHADY SITE WAS FROZEN AT 12" (BEGINNING OF THE SILT LOAM).
STEESE HWY. MP-15.7	29	RIDGE	950	SE	45%	B. SPRUCE, WILLOW (SEMI-OPEN)	0-3" 3-6" 6-12" 12"	FRESH, GROWING PORTION OF THE MOSS MAT (DAN. FEATHER MOSSES) PARTIALLY DECOMPOSED MOSS MATERIAL AND WOODY STEMS; MANY ROOTS; DARK GRAY SPLOTTED WITH STRONG BROWN, SILT LOAM; FRINGLE, WEAK PLATY. STRUCTURE, PH 6.0; MANY ROOTS. FROZEN SILT LOAM.	IN A NEAR-BY SITE HAVING ONLY 2" OF MOSS (TOTAL), FROZEN SILT LOAM WAS ENCOUNTERED AT 18".
KETCHUM RD. (BETWEEN CIRCLE HOT SPRINGS AND CENTRAL)	30	HILLSLOPE	1100	S	20%	ASPEN, B. SPRUCE (SCRUBBY ASPEN TYPE)	0-11" 4-8" 8-22" 22-30"	DK. BROWN SILT LOAM, SLIGHTLY GRAVELLY; GRANULAR STRUCTURE; MANY ROOTS BROWN GRAVELLY LOAM; WEAK SUBANGULAR BLOCKY; MANY ROOTS YELLOW-BROWN COARSE LOAMY SAND; FINE ROOTS WEATHERED, IN-PLACE GRANITIC ROCK; CAN BE CUT INTO WITH SHVEL	GRANITIC OUTCROPS ON RIDGE
EDMANZA CR. (IN OCCUPING CR. DRAINAGE, 5 MI. FROM STEESE HWY)	31	HILLSLOPE	2100	N	15%	(SHRUB THICKET) ALDER, WILLOW, BLUEBERRY, SCOT. B. SPRUCE	0-5" 5-10" 10-12"	SPHAGNUM MOSS, CONTAINING SOME WOODY ROOTS DARK REDDISH BROWN, PARTIALLY DECOMPOSED, WELL MIXED MOSS LAYER; PRINCIPAL ROOT LAYER; PH 4.5 FROZEN ORGANIC MATERIALS; FINE COMPOSITION, THIN LAYER ABOVE	AREA UNDERLAIN BY SCHISTS AT RELATIVELY SHALLOW DEPTHS - PERHAPS 1 1/2 TO 2 FEET AT THIS SITE
SAME GENERAL AREA AS SITE 31, 3 MI. FROM STEESE	32	HILLSLOPE	2100	N	15%	(SHRUB THICKET) ALDER, WILLOW, BLUEBERRY, SCOT. B. SPRUCE	0-11" 11"	SPHAGNUM MOSS FROZEN ORGANIC MATERIAL; ICE LENSES VISIBLE	
SAME GENERAL AREA AS SITES 31, 32, 1.5 MI. FROM STEESE HWY.	33	HILLSLOPE	2100	NE	15%	B. SPRUCE, ALDER (SHRUB THICKET - BLACK SPRUCE TRANSITION)	0-9" 9-12"	SPHAGNUM MOSS STONY, GRAVELLY LOAM; TRANSITIONAL TO SCHIST-BEDDED (ROCK ACCUMULATIONS - PATCHES, STAINERS - APPEAR COMMONLY ON SLOPE)	

LOCATION VISIBILITY	SITE NO.	LANDFORM	ELEV.	ASPECT	SLOPE GRAD.	DOMINANT VEGETATION	PROFILE HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
EAGLE SUMMIT, MI. 109, STEESE	34	HILLSLOPE, NEAR CREST	3500	S	5-10%	DWARF BIRCH, WILLOW, HERBS (ALPINE TUNDRA)	0-4" 4-14" 14-16"	FRESH AND ONLY PARTIALLY DECOMPOSED MOSS LAYER. WELL-DECOMPOSED ORGANIC MATERIALS. STONY, GRAVELLY LOAM; NO FROST TO HERE	ALMANY ROCK FRAGMENTS AND ROCK STRIPES ON FIELDS ON THE LAND SURFACE; ALSO FIRST SOILS OF GRAVELLY, MICACEOUS SANDY LOAMS.
EAGLE SUMMIT, MI. 108, STEESE	35	SEMI-FLAT LOBE ON HILLSLOPE	3700	W	20%	SEDGES, HERBS (ALPINE TUNDRA)	0-20"	DK. BROWN, WELL-DECOMPOSED ORGANIC LAYER WITH NUMEROUS SMALL SCHIST ROCK FRAGMENTS AND SOME SILTS; BECOMES MORE SILTY IN LOWER PORTION. NO FROST ENCOUNTERED.	THE LOWER EDGE OF THE LOBE INTO WHICH THIS EXAMINATION WAS MADE IS ABOUT 3 FEET HIGH.
NO-FORK BIRCH CR., MILE 91, STEESE HWY.	36	HILLSLOPE	2200	S	10-15%	SHAD. B. SPRUCE, ASPEN, WILLOW, BLUEBERRY, MUCH GRASS (BURNED-OVER?)	0-5" 5-8" 8-15" 15"	SPHAGNUM MOSS LAYER; VERY DK. BROWN, WELL-DECOMPOSED MOSS MATERIAL WITH SOME SILTS; MANY ROOTS; SOME DECOMPOSING WOODY STEMS; PH. 6.0 BROWN SILT LOAM FROZEN SILT LOAM	SCHIST BEDROCK UNDERLIES ENTIRE SLOPE; STONY TRANSITIONAL MATERIAL COMMONLY ENCOUNTERED AT 5" TO 16" DEPTHS
U. OF ALASKA EXP. STATION, FAIRBANKS	37	VALLEY SLOPE	600	N	5-10%	COTTONWOOD, ASPEN, BIRCH (CLOSED HARDWOOD FOREST)	0-1" 1-20"	LITTER AND MOSS LAYER DK. GRAY BROWN (GRAY BROWN DRY) SILT LOAM; MICACEOUS; FRAGILE, NON-STICKY; PH @ 18" - 7.0. PROBED TO 40", NO FROST ENCOUNTERED.	FAMOUS THERMOKARST EXAMPLE (POLY, KELLOGG, NYCARD). THE DARK-FRAMED LAND NOW COMPLETELY CUT UP INTO MOUNDS 3 TO 5' (AND MORE) HIGH AND 15' TO 40' (OR MORE) WIDE; ROUGHLY POLYGONAL BLOCKS; TREES NOW 40' TO 50' TALL.
5 MI. N.E. OF MENTASTA VILLAGE	38	UNDULATING VALLEY FLOOR	2400	NEARLY LEVEL	<2%	ALDER, WILLOW, BLUEBERRY, LAB. TEA, LUPINES (BURNED-OVER SPRUCE)	0-3" 3-6" 6-14" 14"	PARTIALLY TO WELL-DECOMPOSED MOSS AND LITTER LAYER DARK GRAY SILT LOAM; GRANULAR STRUCTURE, FRAGILE; MANY ROOTS GRAYISH BROWN SILT LOAM (NEAR VERY FINE SANDY LOAM); PLOTCHED WITH REDDISH YELLOW; VERY FRAGILE SANDS AND GRAVELS; LOOSE	BURNED-OVER SINCE YOUNG. PREVIOUSLY, FIRE LANE W/ EROSION PROBLEMS - NO EROSION DENSE AND NOT ENOUGH SLOPE TO WASH.
MENTASTA LODGE (ON TRAIL CUT-OFF)	39	MOUNTAIN SLOPE, LOWER FLANK	2250	W	70%	BLACK SPRUCE (MOSTLY CLOSED)	0-10" 10-30" 30"	FRESH AND PARTIALLY DECOMPOSED MOSS LAYER; INCLUDES MANY ROOTS DARK GRAY FINE SANDS; MOIST; FEW ROOTS ICE LENSES AND FROZEN SANDS; ABRUPTLY ENCOUNTERED	MEASUREMENTS MADE PERPENDICULAR TO SLOPE. SANDS MAY BE WIND-BLOWN. THERMOKARST APPEARS TO BE OF LIMITED EXTENT IN THIS AREA - LOCATED IN THE SMALL PATCHES OF BLACK SPRUCE.

LOCATION, QUANTITY	SITE No.	LANDFORM	ELEV.	ASP.	SLOPE GRADE	DOMINANT VEGETATION	PROFILE HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
11R-65.5, TOP CUT-OFF	40	HILLSLOPE	2227	N	20%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-1" 1-5" 5-9" 9-14" 14"	FRESH, GROWING PORTION OF THE MOSS MAT DARK REDDISH-BROWN, PARTIALLY DECOMPOSED MOSS MATERIALS AND LEAVES OF WOODY PLANTS; MANY ROOTS NEARLY BLACK, WELL DECOMPOSED ORGANIC MATERIALS INCLUDING SOME WOODY STEMS UP TO 2" DIAMETER; ROOTS COMMON DARK BROWN, HIGHLY ORGANIC SILT LOAM; VERY FRIABLE; ROOTS COM. FROZEN, GRAY SILT LOAM.	SURFACE MOSS LAYER INCLUDES 2 REINDEER LICHENS (CLAVARIA, SPS.) AND 3 FEATHER MOSSES (HYPHUM, PLUMMOZUM, HYLOCOMIUM SPS.)
TOP CUT-OFF, AFRICK, M. 7-79 (UP DRAINAGE FROM HWY. ABOUT 1/4 MILE	41	CREEK VALLEY BOTTOM (CLEARLY DEFINED BY STEEP HILL- SLOPES ADJAC- ENT).	2300	E	5%	GRASS, SEDGES (FIRE LANE, ORIGINALLY IN SPRUCE-WHITE AND BLACK)	0-8" 8-30" 30"	MOSS LAYER, INCLUDING SOME LENSES OF VERY FINE SANDY LOAM; PROMINENT HORIZONTAL LAYERING DUE TO ROOTS AND SEDIMENTS. GRAYISH, VERY FINE SANDY LOAM OR SILT LOAM, SPATCHED WITH IRON STAINS, INCLUDES SOME LENSES OF SAND; VERY FRIABLE GRAVELS AND SANDS	THIS PROFILE WAS EXPOSED ON A SIDE OF A 4' DIA. HOLE, 2' DEEP, THAT OCCURS IN A FIREBREAK; APPEARS TO HAVE FORMED BY COLLAPSE OR SUBSIDENCE BUT NOT CERTAIN WHAT ROLE BURIED ICE PLAYED—IF ANY. A SMALL, SHOT GULLY LEADS AWAY FROM ADJACENT SIDE OF HOLE.
(PROX. OR SO UP DRAINAGE FROM SITE 41)	42	"	2300	E	5%	"	0-10" 10-27" 27"	DARK BROWN PEATY (WOODY) MATERIAL. SPATCHED GRAYS AND YELLOWS; INTERBEDDED, VERY FINE SANDY LOAMS AND SILTS. GRAVELS AND SANDS	THIS PROFILE WAS DUG IN THE BOTTOM OF ANOTHER, LARGER-DIAMETER SINK-LIKE OR DEPRESSION AREA. THE BOTTOM IS ABOUT 20" BELOW THE SURFACE OF THE ADJACENT HILL. EDGE "WALLS" ARE CRACKED AND SOME SLUMPING IS TAKING PLACE. THE IMMEDIATELY ADJACENT LAND HAS 5" OF PEATY MATERIAL WITH GRAVEL AT 16", WHICH GIVES SOME BASIS FOR BELIEVING THE LOWER-LYING AREA MAY BE A NATURAL (PRE-FIREBREAK) SWALE OR DEPRESSION.
1/2 MILE UP DRAINAGE FROM SITE 42	43	SHORT, STEEP PITCHED SLOPE OF A SPACIOUS AREA ADJACENT TO THE DRAINAGE WAY.	3000	N	60%	STUNTED PAPER BIRCH, ALDER, WILLOW (PAPER BIRCH TYPE)	0-14" 14"	SPHAGNUM MOSS LAYER FROZEN SOIL (SILTY)	THE ONLY PERMAFROST OBSERVED IN THIS AREA. TOPOGRAPHIC SHADING IS A PERMAFROST FACTOR ON THIS SITE.

LOCATION, VICINITY	SITE NO.	LANDFORM	ELEV.	SLP.	STAFF COND.	DOMINANT VEGETATION	PROFILE HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
LOGGING CABIN CREEK	44	GULLIED, FOOTSLOPE	2500	W	5-10%	GRASSES AND SEDGES (FIREBREAK PREVIOUSLY IN BLACK SPRUCE)	0-15" 12-36"	GRAY SPLOTTED WITH YELLOW SILT LOAM; FINELY LAMINATED OR PLATY STRUCTURE; FRIABLE; MANY ROOTS. GRAY AND DARK GRAY, FINELY LAMINATED SILT LOAM; FRIABLE WHEN BROKEN OUT BUT FIRM IN PLACE - STANDS VERTICALLY TO HEIGHTS OF AT LEAST 3'; MANY FINE ROOTS. SILTS CONTINUE TO DEPTHS IN EXCESS OF 10' (THE GULLY IS ROUGHLY V-SHAPED AT THIS POINT, ABOUT 10' MAXIMUM DEPTH AND 25' WIDE ACROSS TOP).	FIREBREAK CLEARING. GULLY REPORTED TO HAVE DEVELOPED SOON AFTER THE FIREBREAK WAS CONSTRUCTED; CREDITED TO THERMAL EROSION. VOLUME OF SEDIMENT AT LOWER END ON FLOO PLAIN MEADOW IS SMALL IN COMPARISON TO VOLUME OF PRESENT GULLY.
(FORESTED MTA ADJACENT (SOUTH) TO SITE 44)	45	FOOTSLOPE	2500	W	5-10%	BLACK SPRUCE (OPEN, LOW GROWING)	0-7" 9-13" 13"	MOSS LAYERS DARK GRAY SILT LOAM, HIGH IN ORGANIC MATTER; FRIABLE; MANY ROOTS FROZEN SILT LOAM.	
LOGGING CABIN CR. (AREA NORTH OF CLEARED STRIP)	46	FOOTSLOPE	2500	N	5-10%	BURNED B. SPRUCE (OPEN, LOW GROWING)	0-4" 4-20" 20"	MOSS LAYER DARK GRAY SILT LOAM WITH STAININGS OF REDDISH YELLOW; FRIABLE FROZEN SILT LOAM	THE THINNER TOTAL MOSS LAYER BELONGING TO THAT ON SITE 45 IS ATTRIBUTED TO THE BURN, WHICH IN TURN DIRECTLY AFFECTS DEPTH TO FROST.
GILLIAM BURN, SA. OF CHESTNUT CREEK	47	RIVER TERRACE	1850	NEARLY LEVEL	<2%	BURNED B. SPRUCE	0-5" 5-7" 7-20" 20"	BROWN, FIBROUS MOSS LAYER VERY DARK GRAY SILT LOAM GRAY SILT LOAM; WET FROZEN SILT LOAM	DEPTH TO PERMAFROST IN NEARBY HWY-RIGHT-OF-WAY CLEARING WAS 32"
OLD BURN, 2 MI. SA. OF HOGAN HILL	48	LAKED PLAIN	2200	NEARLY LEVEL	<2%	B. SPRUCE (STUMPED) BLUEBERRY (OPEN, LOW GROWING)	0-1" 1-3" 3-8" 8+	FRESH, GROWING PORTION OF THE MOSS AND LICHEN MAT WELL DECOMPOSED ORGANIC MATERIALS; NEARLY BLACK IN COLOR; PH 6.5-7.0 MANY ROOTS. DARK GRAY MOTTLED CLAY WITH SMALL AMOUNTS OF 1/2" DIAMETER BLACK PEBBLES; VERY STICKY, VERY PLASTIC; PH 7.0; VERY moist AND COLD. GRAVELS HINDERED PROBING BUT CLAYEY MATERIAL CONTINUES TO 40'+. NO FROST ENCOUNTERED.	BURN REPORTED AS OF ABOUT 1910. GLACIO-LAKESTRINE AREA, MANY LAKES AND MARSHES IN THE AREA.
LITTLE CHENA RIVER - MI. 12. CHENA HOT SPRING RD.	49	STREAM FLOOD PLAIN	500	NEARLY LEVEL	<2%	SEDGES, WILLOW	0-4" 4-15"	MAT OF SEDGE ROOTS AND MOSSES GRAY SILT LOAM WITH MOTTLES OF YELLOW-BROWN; STICKY, PLASTIC; SATURATED. FIRMER SOIL ENCOUNTERED AT 36" WITH PROBE BUT NO FROZEN LAYER WITHIN 46".	ABANDONED FIELD. VERY DIFFICULT TO DIG A PIT BECAUSE SOIL LITERALLY FLOWS INTO HOLE IN MILE DIGGING. GROUND SURFACE QUITE RUBBERY TO WALK ON.

LOCATION	SITE NO.	LANDFORM	ELEV.	ASP.	SLANT (%)	DOMINANT VEGETATION	PROFILE HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
MI. 16, LENA HT SPRGS. RD.	50	LOW TERRACE OF SECOND BOTTOM	700	W	45%	BLACK SPRUCE, TAMARACK, BLUE BERRY (OPEN, LOW-GROWING)	0-1" 1-4" 4-5" 5-12" 12-29" 29"	FRESH, GROWING PORTION OF THE MOSS MAT (FEATHER MOSSES) PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS BLACK SILT LOAM, HIGHLY ORGANIC; FRIABLE DARK GRAY SILT LOAM WITH MOTTLES OF YELLOW BROWN AND IRON STAININGS; PLATY STRUCTURE; HICACABOUS; MANY ROOTS GRAY SILT LOAM, MOTTLED WITH IRON STAININGS; BECOMES WETTER WITH DEPTH. FROZEN SILT LOAM.	
MI. 4.5, CENAH HT. SPRINGS RD.	51	STREAM FLOOD PLAIN	600	NEARLY LEVEL	4%	BLACK SPRUCE, TAMARACK (OPEN, LOW-GROWING)	0-1" 1-7" 7-10" 10-20" 20"	FRESH, GROWING PORTION OF THE MOSS MAT. (DOM. SPHAGNUM) PARTIALLY DECOMPOSED SPHAGNUM AND OTHER MOSSES; MANY ROOTS BLACK SILT LOAM, HIGHLY ORGANIC DARK GRAY, MOTTLED SILT LOAM. FROZEN SILT LOAM.	IN THE ASSOCIATED WETTER, LOWER-LYING DEPRESSIONS, NO FROST WAS ENCOUNTERED TO DEPTHS OF 48".
MURPHY DOME AIR FORCE LUSTAL - 4 MI. SW	52	HILLSLOPE - MT. CREST	1700	S	5%	BLACK SPRUCE, PAPER BIRCH, ASPEN, WILLOW, BLUE BERRY (OPEN, LOW-GROWING BLACK SPRUCE)	0-1 1/2" 1 1/2-5" 5-7" 7"+	FRESH, GROWING PORTION OF THE MOSS MAT (FEATHER, DOMINANTLY) PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS BLACK SILT LOAM; FRIABLE; MANY FINE ROOTS. BLACK SILT LOAM CONTINUING INTO VERY STONY MATERIAL; UNDERLYING BEDROCK IS OF SCHISTS.	
TRAIL RIDGE ROAD BELOW MURPHY DOME	53	SADDLE AND RIDGE	1700	SE	12%	BLACK SPRUCE, WILLOW, BLUE BERRY (OPEN, LOW-GROWING)	0-8" 8-24"	MOSS LAYERS; MANY WOODY ROOTS DARK BROWNISH YELLOW AND YELLOW BROWN SILT LOAM; BECOMING STONY IN LOWER PORTION.	NO PERMAFROST ENCOUNTERED.
NEWLY CONSTRUCTED LOGGING RD., TAKING OFF OF OLD NENANA RD.	54	BENCH AREA ON LOWER SIBSLOPE	550	SW	45%	WHITE AND BLACK SPRUCE, ASPEN (CLOSED WHITE SPRUCE)	0-1" 1-5" 5-10" 10-36"	FRESH, GROWING PORTION OF THE MOSS MAT; HORSETAILS COMMON. PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS DARK BROWN SILT LOAM; WEAK PLATY STRUCTURE, FRIABLE; PH - 6.0; MANY ROOTS. DARK GRAYISH BROWN SPOTCHED WITH DARK YELLOWISH BROWN, SILT LOAM; VERY FRIABLE; PH - 5.8; WOODY ROOTS CONTINUING. LOESS CONTINUES TO 72" IN NEARBY ROAD CUT.	NO PERMAFROST ENCOUNTERED. GOOD ASPEN TREE GROWTH - AN ASPEN LOG 14.5" DIA. @ 20' AT SHOWS SOME 200 ANNUAL RINGS. SEEMS THIS AGE RATHER REMARKABLE FOR ASPEN.
"	55	LOWER VALLEY SIBSLOPE (OR LOW TERRACE?)	500	N	5%	BURNED-OVER B. SPRUCE (APPROX. 5 YRS. OLD), WILLOW, BLUEBERRY	0-1/2" 1/2-3" 3-10" 10-20"	FRESH, GROWING PORTION OF THE MOSS MAT; HORSETAILS COMMON VERY DARK BROWN, WELL DECOMPOSED ORGANIC MATERIALS; SILTY; MANY ROOTS MOTTLED GRAYISH AND YELLOWISH BROWNS, SILT LOAM; FRIABLE; WITH ROOTS GRAYS, STREAKED WITH DARK GRAY AND MOTTLES OF REDDISH YELLOW, SILT LOAM; SLIGHTLY PLASTIC.	NO PERMAFROST TO 48" (DEPTHS) A GULCH SYSTEM HAS DEVELOPED FROM WHAT APPEARS TO HAVE BEEN ICE-MELT COLLAPSE. DOES NOT OCCUR IN A FIRE-BREAK. GULLIES ARE ABOUT 6' DEEP (CONT' NEXT SHEET)

LOCATION VICINITY	SITE NO.	LANDFORM	ELEV.	ASP.	SLOPE GRAD.	DOMINANT VEGETATION	PROFILE METERING	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
									AND ABOUT THAT WIDE ACROSS THE TOP EDGES VERY UNEVEN WITH 50% OR MORE MOSS LAYERS HANGING VERTICALLY. SOME GROUND CRACKS GO STRAIGHT BACK FROM GULLY SIDES.
NEAR SITE #55	56	LOWER VALLEY FLOOD-SLOPE (OR LOW TERRACE?)	500	N	45%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-1" 1-6" 6-10" 10-26" 26"	FRESH, GROWING PORTION OF THE MOSS MAT (DAN. FEATHER MOSES) VERY DARK BROWN, PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS INCLUDING SPRUCE ROOTS TO 1/4" DIA. HEARLY BLACK SILT LOAM, HIGHLY ORGANIC MOTTLED GRAY, YELLOW BROWN SILT LOAM WITH IRON STAININGS; SLIGHTLY PLASTIC FROZEN SILT LOAM.	THIS SITE IS IN A SMALL UNBURNED "ISLAND" OF BLACK SPRUCE WITHIN THE BURNED AREA EXAMINED IN SITE #55.
GILMAN BURN AREA (ADJACENT TO GLENN HWY., S. OF CHRISTOPHER)	57	HIGH TERRACE	2000	NEARLY LEVEL	<2%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-5" 5-7" 7-26" 26"	MOSS LAYERS BLACK SILT LOAM, HIGHLY ORGANIC MOTTLED GRAYS, YELLOWISH BROWNS SILT LOAM; PLASTIC FROZEN SILT LOAM.	THIS SITE IS IN A SMALL UNBURNED "ISLAND" OF THE GILMAN BURN AREA. A SITE IN THE BURNED AREA, REMAINING 2-3" OF ORGANIC SURFACE (SILTY), WAS PRESSED TO 1/2" BUT IN FRONT WAS ENLIGHTENED. A NEARBY 15% SLOPING SLOPE SUPPORTING WHITE SPRUCE REVEALED THESE RELATIONSHIPS: 2" SPAG. MOSS = 33" TO PERMAFROST 5" " " " 26" " " 7" " " " 21" " "
EUREKA LODGE (VARI. N. OF) GLENN HWY.	58	MORAINES (LOWER SLOPE)	3430	N	5%	WILLOWS WITH SCOT. B. SPRUCE; APPEARS TO BE NEAR TREE LINE (BIRCH-ALDER-WILLOW THICKETS)	0-14" 14-18" 18-26" 26"	SPHAGNUM MOSS LAYER WITH SOME WOODY ROOTS. VERY DARK BROWN SILT LOAM, HIGHLY ORGANIC; FRIBBLE, WET VERY COBBLY, GRAVELLY LOAM (CLAY LOAM?); SLIGHTLY STICKY; WATER STANDING IN HOLE AT 22". DARK GRAY. FROZEN LAYER. ICE LENSES VISIBLE IN A SMALL SAMPLE OF SOIL.	

LOCATION (MILEAGE)	SITE NO.	LANDFORM	ELEV.	ASPECT	CLAMP SOIL %	DOMINANT VEGETATION	PROFILE HAZARD	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
3/2 MI. NORTH OF EUREKA LODGE	59	MORaine (MID-SLOPE POSITION)	3400	N	15%	DWARF BIRCH, WILLOW, BLUEBERRY (BIRCH-ALDER-WILLOW THICKETS)	0-1" 1-6" 6-8" 8-18" 18-22"	FRESH, GROWING PORTION OF MOSS AND LICHEN MAT (MUCH REINDEER LICHEN); BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; WITH WOODY ROOTS BLACK, SPLOTTED WITH DARK BROWN, SILT LOAM DARK BROWN SILT LOAM; WEAK GRANULAR STRUCTURE; FRIABLE VERY GRAVELLY SANDS AND LOAMY SANDS; DARK GRAY BROWN; LOOSE, MOIST BUT NOT WET.	PERMAFROST NOT REACHED
"	60	MORaine (BELOW MID-SLOPE POSITION)	3370	N	15%	WILLOW, BLUEBERRY, LAB. TREE (BIRCH-ALDER-WILLOW THICKETS)	0-14" 14-17"	SPHAGNUM MOSS; SLIGHTLY MOUNDED; SMALL WOODY PLANTS GROWING ON AND THROUGH IT. FROZEN SPHAGNUM MOSS; ICE VISIBLE ALL THROUGH THE S* SAMPLE - CLEAR ICE, LENSES AND CRYSTALS.	THIS SITE OCCURS ON THE NORTH SIDE OF A SINGLE BLACK SPRUCE.
"	61	MORaine (CONVEX SLOPE)	3350	ENE	16%	WILLOW, DWARF BIRCH, BLUEBERRY, SEAT. B. SPRUCE (BIRCH-ALDER-WILLOW THICKETS)	0-1" 1-6" 6-7" 7-34"	FRESH, GROWING PORTION OF THE MOSS AND LICHEN MAT (DM. REINDEER); PARTIALLY DECOMPOSED MOSS MATERIAL; DARK BROWN; MANY ROOTS BLACK, WELL-DECOMPOSED ORGANIC MATERIAL; SLIGHTLY SILTY BROWN, GRAVELLY LOAMS AND HEAVY LOAMS; FRIABLE TO FIRM; A LENS OF BLACK MOTTLED SILTS AT 12". NO PERMA-FROST ENCOUNTERED.	
GUNSIGHT	62	STREAM VALLEY BOTTOM	3000	S	<5%	BLUEBERRY, DWARF BIRCH, WILLOW	0-2" 2-4" 4-16" 16-22"	FRESH, GROWING PORTION OF THE MOSS AND LICHEN MAT (DM. REINDEER); PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS BROWNISH GRAVELLY LOAM; FRIABLE, BECOMING FIRM BELOW 10" GRAYISH BROWN GRAVELLY, COBBLY CLAY LOAM; STICKY, FIRM; WET, SATURATED BELOW.	REPEAT OF SITE #2. NO FROZEN GROUND TO 42" (PROBED ON 9/16/75)
"	63	"	3000	S	<5%	SEDGES	0-1" 1-5" 5-10" 10+	FRESH, GROWING PORTION OF THE MOSS MAT MATTED BUT LARGELY UNDECOMPOSED MOSS MATERIAL; MANY ROOTS BLACK, WELL-DECOMPOSED ORGANIC MATERIAL GRAYISH SILTY CLAY; FIRM, PLASTIC; SATURATED	REPEAT OF SITE #3. PROBED TO 42", NO FROZEN GROUND ENCOUNTERED - 9/16/75
"	64	TERRACE	3050	E	2%	BLACK SPRUCE, WILLOW (OPEN B. SPRUCE)	0-1" 1-3" 3-12" 12+	FRESH, GROWING PORTION OF THE MOSS MAT MATTED BUT LARGELY UNDECOMPOSED MOSS MATERIAL BLACK, WELL-DECOMPOSED ORGANIC MATERIAL, BECOMING SLIGHTLY SILTY IN LOWER PORTION. GRAYISH, SLIGHTLY GRAVELLY SILT LOAM.	REPEAT AREA OF SITE #4. PROBED TO 43", NO FROZEN GROUND ENCOUNTERED - 9/16/75

LOCATION, VEGETATION	SITE NO.	LANDFORM	ELEV.	ASR.	SLOPE GRAD	DOMINANT VEGETATION	DEPTH (INCHES)	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
LIBERTY FALLS NR. SHELTON	65	CREEK VALLEY BOTTOM	1175'	E	410%	B. SPRUCE, WILLOW, ALDER, LARSTEN (OPEN B. SPRUCE)	0-1" 1-10" 10-18" 18"	FRESH, GROWING PORTION OF THE MOSS MAT BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS BLACK, WELL-DECOMPOSED ORGANIC MATERIAL; SLIGHTLY SILTY; VERY FRIABLE; MANY ROOTS WITH SOME ONLY PARTIALLY DECOMPOSED ROOTS AND/OR OTHER WOODY MATERIALS. FROZEN BROWN, WELL-DECOMPOSED ORGANIC MATERIAL; ICE VEGETS AND CRYSTALS VISIBLE; ABUNDANTLY FRIABLE, WATER NOT STANDING ON TOP OF THE TERMAFROST.	REPEAT EXAMINATION OF SITE #6 (ADJACENT TO) 9/17/75.
LOWER TONGUE RIVER, CUMING	66	RIVER FLOOD PLAIN	615'	NEARLY LEVEL	1%	BURNED B. SPRUCE	0-1/2" 1/2-22" 22-34" 34"	FRESH, GROWING MOSS (A SHORT, MAT-LIKE TYPE) BLACK, WELL-DECOMPOSED ORGANIC MATERIAL, INTERSTRATIFIED WITH HIGHLY ORGANIC SILTS. GRAYISH SILT LOAM WITH THIN STRATA OF PLASTIC SILTY CLAYS; MOIST BUT NOT SATURATED. FROZEN SOIL, SIMILAR TO ABOVE.	REPEAT EXAMINATION OF THE GENERAL AREA OF SITE #6 9/17/75.
"	67	"	615'	NEARLY LEVEL	1%	PARTIALLY BURNED B. SPRUCE	0-1" 1-28" 28"	FRESH, GROWING PORTION OF THE MOSS MAT BLACK, WELL-DECOMPOSED ORGANICS, INTERSTRATIFIED WITH VERY DARK BROWN SILT SEDIMENTS. FROZEN SILT, SIMILAR TO ABOVE.	" " "
"	68	"	615'	NEARLY LEVEL	1%	UNBURNED BLACK SPRUCE (OPEN)	0-1" 1-2" 2-17" 17"	FRESH, GROWING FEATHER MOSES VERY DARK GRAY PARTIALLY DECOMPOSED LICHENS (DOAN OF THE FALLOUSE GROUP) WITH SOME SEDIMENTS VERY DARK BROWN, WELL-DECOMPOSED ORGANIC MATERIAL; LIGHT VOLUME WEIGHTS; ABUNDANT ROOTS. FROZEN GRAYISH SILTY SEDIMENTS; MUCH ICE VISIBLE - GLIMS AND CRYSTALS.	"
APL. ESTATE, ALTO	69	TERPACES	1125'	S	45%	BLACK, WHITE SPRUCE	0-1" 1-6" 6-12" 12-24" 24"	FRESH, GROWING PORTION OF THE MOSS MAT (AND FEATHER MOSES) PARTIALLY DECOMPOSED MOSS MATERIALS; BROWN; MANY ROOTS GRAYISH SILT LOAM; FRIABLE GRAYISH GRAVELLY SANDS; LOOSE FROZEN GRAVELLY SANDS	REPEAT EXAMINATION OF SITE #9 (ADJACENT TO) 9/17/75.

LOCATION VICINITY	SITE NO.	LANDFORM	ELEV.	ASPECT	SLOPE GRAD	DOMINANT VEGETATION	PROFILE DEPTH	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
REL. M. 715	70	TERRACE(?)	1725	S	45%	BLACK, WHITE SPRUCE (CLOSED)	0-1 1/2" 1 1/2-10" 10-15" 15"	FRESH, GROWING PORTION OF THE MOSS MAT (DOM. FEATHER MOSSES) BROWN, PARTIALLY DECOMPOSED MOSS MATERIALS; WELL-BOUND WITH WOODY ROOTS. DARK BROWN, WELL-DECOMPOSED ORGANIC MATERIALS; MANY ROOTS FROZEN GRAYISH SILT LOAM; ABRUPTLY ENCOUNTERED, UNDULATING SURFACE; 1/2" PURE ICE ON THE FROZEN MATS	
RICHARDSON HWY. MI. 84	71	HIGH TERRACE	1915	NEARLY LEVEL	< 2%	BLACK, WHITE SPRUCE, COTTONGRASS, WILLOW, SEDGES. (OPEN SPRUCE)	0-1 1/2" 1 1/2-2" 2-6" 6-10"	FRESH, GROWING PORTION OF THE MOSS MAT (DOM.) BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL BLACK, WELL DECOMPOSED ORGANIC MATERIAL. GRAYISH VERY FINE SANDY LOAM (SILT LOAM?)	REPEAT EXAMINATION OF SITE #12 (ADJACENT TO) PROB'D TO 45" - NO FROST, 9/10/75. THE MOSS MAT HERE IS FAIRLY TYPICAL OF A BURNED SURFACE - RELATIVELY THIN MOSS LAYER WITH THE BLACK, DECOMPOSED ORGANIC MATERIAL ('MUCK') CLOSE TO THE TOP.
JUNCTION, ECKSTEIN RD, RICHARDSON HWY.	72	ALLUVIAL FAN	1910	W	< 5%	BLACK, WHITE SPRUCE (OPEN)	0-5" 5-30"	MOSS MAT GRAYISH, GRAVELLY FINE SANDY LOAM	REPEAT EXAMINATION IN GENERAL AREA OF SITE #10 ORIGINAL PIT COULD NOT BE LOCATED. PROB'D TO 32" - NO FROST, 9/17/75.
RICHARDSON HWY. MI. 96	73	HIGH TERRACE	1320	NEARLY LEVEL	< 2%	BLACK SPRUCE, ASPEN, COTTONGRASS, OCC. WHITE SPRUCE (CLOSED SPRUCE - HARDWOODS)	0-2" 2-6" 6-15" 15-25" 25"	FRESH, GROWING PORTION OF THE MOSS MAT (DOM. FEATHER MOSSES) BLACK, WELL-DECOMPOSED ORGANIC MATERIAL; ABUNDANT ROOTS GRAYISH-BROWN, HIGHLY ORGANIC SILTY MATERIAL; MANY ROOTS GRAYISH SILTY CLAY LOAM; PLASTIC, STICKY; SATURATED IN LOWER PORTION; CONTAINS A FEW ROUNDED GRAVELS. FROZEN SILTY CLAY LOAM.	REPEAT EXAMINATION IN GENERAL AREA OF SITE #13. ORIGINAL PIT COULD NOT BE LOCATED. 9/17/75.

LOCATION/VICINITY	SITE NO.	LANDFORM	ELEV.	ASPECT	SLOPE GRAD.	DOMINANT VEGETATION	HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
GOLDSTEIN GULLY (M. 42), ALASKA RAILROAD	74	LOESS-FILLED VALLEY BOTTOM SLOPES	450	E	4%	BLACK SPRUCE (12'-15' HEIGHTS) (OPEN, LOW-GROWING)	0-5" 5-10" 10-18" 11-30"	MOSS MAT (DOM. FEATHER MOSES); MANY WOODY ROOTS. BLACK, HIGHLY ORGANIC SILT LOAM; MANY ROOTS. GRAY SILT LOAM, MOTTLED WITH GRAY-BROWN, REDDISH BROWN, AND OLIVE; SILT LOAM; PLASTIC; SATURATED (ALMOST SEMI-FLUID). ICE LENSES AND MASSES. SURFACE IS VERY UNEVEN (KARST-LIKE) BUT SMOOTH AND HARD. ONE LARGE HOLE (6" ACROSS, 12" DEEP) VISIBLE BETWEEN ICE MASSES WHICH APPEAR TO BE SEVERAL FEET THICK.	THIS EXAMINATION WAS MADE IN ONE OF THE POLYGONAL CHANNELS, WHICH ARE ORIENTED IN POSITIONS PERPENDICULAR TO THE LARGE GULLY. TIES ALONG THE EDGES OF THESE CHANNELS (WHICH ARE USUALLY NARROW - 2' AS ACROSS, SHALLOW - 1' TO 2' DEEP, AND OF VARIABLE LENGTH - 10'S OF FEET) ARE MUCH TILTED.
" (SOME 10' AWAY FROM SITE 74)	75	"	450	E	4%	BLACK SPRUCE (12'-15' HEIGHTS) (OPEN, LOW-GROWING)	0-12" 13"	UNFROZEN MOSS MAT AND SILT LOAMS; SOIL NOT SATURATED. FROZEN SILT LOAM; NO ICE LENSES OR MASSES VISIBLE.	THIS EXAMINATION WAS MADE IN AN ELEVATED (IN RELATION TO THE LOWER-LYING CHANNELS) MOUND AREA.
S.E. OF ALPINE, SOME ROAD (1 MI.) APPROX. TO LINCOLN PT.	76	HILLSLOPE	1000	E	3%	BLACK SPRUCE, WILLOW, ALDER (OPEN)	0-12" 12-3" 3-5" 5-8" 8-12" 15' +	FRESH, GROWING PORTION OF THE MOSS MAT (DOM. FEATHER MOSES). BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS. PALE BROWN ORGANIC LAYER CONSISTING MOSTLY OF VERY FINE ROOTS WITH SOME SILTS; LOW VOLUME WEIGHT. BROWN SILT LOAM; GRANULAR STRUCTURE (FROM SUBANGULAR BLOCKY); ABUNDANT FINE ROOTS. SPLOTTED, YELLOWISH BROWNS AND OLIVE BROWNS; SLIGHTLY GRAVELLY SILT LOAM; GRANULAR STRUCTURE; BECOMING NON-GRAVELLY; PROBED TO 48" - NO FROST ENCOUNTERED.	
"	77	HILLSLOPE	1000	NW	11%	BLACK SPRUCE, WILLOW, ALDER (SEMI-CLOSED)	0-3" 3-6" 6-7" 7-10" 10-17" 17' +	FRESH, GROWING PORTION OF THE MOSS MAT (DOM. FEATHER MOSES). WELL-DECOMPOSED MOSS MATERIAL; MANY ROOTS. BLACK, HIGHLY ORGANIC SILT LOAM. DARK BROWN SILT LOAM, TONGUE'D OR SPLOTTED WITH GRAY BROWN; FRIABLE; MANY ROOTS. LIGHT OLIVE BROWN SILT LOAM; FRIABLE, FEW ROOTS. DECAYING GRAVELLY AND/OR STONY. AREA GENERALLY UNDERLAIN WITH SCHISTS AT RELATIVELY SHALLOW DEPTHS.	PROBED TO 30" - NO FROST ENCOUNTERED. BETTER THAN AVERAGE B. SPRUCE GROWTH.

LOCATION	SITE NO.	LANDFORM	ELEV.	ASPECT	DIAM. GRAV.	DOMINANT VEGETATION	HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
SE. OF HUNTER SOME ROAD (LINCOLN DR.)	78	HILLSLOPE	1663	SW	12%	BLACK SPRUCE, WILLOW, PAPER BIRCH; BLUEBERRY LARB. TEA (OPEN)	0-2" 2-5" 5-7" 7-8" 8-12" 12-14"	FRESH, GROWING PORTION OF THE MOSS MAT (DAM. FEATHER). PARTIALLY DECOMPOSED MOSS MATERIALS WITH MANY WOODY STEMS; MANY ROOTS. DARK BROWN WELL-DECOMPOSED ORGANIC LAYER; FIBROUS, MANY ROOTS; CONTAINS SOME SILTS. LIGHT GRAY SILT LOAM (A ₂ HORIZON) GRAY BROWNS AND LIGHT OLIVE BROWNS, SILT LOAM; FRIABLE; FEW ROOTS - VERY FEW BELOW 16". BECOMING STONY.	PROBED TO 28" - NO FROST ENCOUNTERED.
GOLD HILL (NEAR FAIRBANKS)	79	TERRACE	650	N.	<5%	BLACK SPRUCE (SEMI-CLOSED)	0-2" 2-8" 8-16" 16-12" 12-26" 26"	FRESH, GROWING PORTION OF THE MOSS MAT (DAM. FEATHER, MOSSES) PARTIALLY DECOMPOSED, FIBROUS ORGANIC LAYER; MANY ROOTS BROWN WELL-DECOMPOSED ORGANIC LAYER WITH SOME SILTS. BLACK, HIGHLY ORGANIC SILT LOAM; GRANULAR STRUCTURE; ROOTS PLentiful OLIVE GRAY SILT LOAM; FRIABLE FROZEN SILT LOAM.	BETTER THAN AVERAGE B. SPRUCE GROWTH.
DAVIDSON CRYSTAL AND DITCH - EAST OF POOR CREEK. STEER HILL.	80	LOW TERRACE (OP. SECOND BOTTOM)	700	NEARLY LEVEL	1%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-1" 1-5" 5-12" 12-20" 20"	FRESH, GROWING PORTION OF THE MOSS MAT (FEATHER MOSSES, REINDEER AND FOLIAGE LICHENS) PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS DECOMPOSED SPHAGNUM MOSS MATERIALS; LOWER PORTION DARKER BROWN AND SLIGHTLY SILTY. DARK BROWN SILT LOAM; GRANULAR STRUCTURE, FRIABLE; FINE ROOTS PLentiful. FROZEN SILT LOAM; ICE CRYSTALS VISIBLE.	SURFACE WATER STANDING IN VEHICLE TRACKS ON EITHER SIDE - FROZEN GROUND AT 1/2" (PROBED) PROBING OF ADJACENT FOOTSLOPE (TRANSITION TO HILLSLOPE) SHOWED: SHADED SITES (BY SPRUCE) - PERMAFROST AT DEPTHS OF 10-15" OPEN SITES - PERMAFROST AT DEPTHS OF 20-40" NOTE - PROBING PROVIDES A QUICK MEANS TO DETERMINE DEPTH TO PERMAFROST BUT IT FAILS TO GIVE THE NECESSARY ASSOCIATED INFO. THAT ALLOWS MEANINGFUL COMPARISONS (E.G. - MOSS THICKNESS). THE ABOVE FOOTSLOPE IS NORTH FACING, 7% SLOPING.

LOCATION, VICINITY	SITE NO.	LANDFORM	ELEV.	ASP.	SLOPE GRAD.	DOMINANT VEGETATION	HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
DAVIDSON SPRING AND DITCH (E. OF PIERCE CR.)	81	HILLSLOPE	750	N.	10%	BLACK SPRUCE (SEMI-CLOSED)	0-2" 2-5" 5-6" 6-10" 10-12" 18 +	FRESH AND PARTIALLY DECOMPOSED MOSS LAYERS (DARK BROWN. ORGANIC LAYER; FIBROUS, TOUGH.; MANY VERY FINE ROOTS); BLACK, HIGHLY ORGANIC SILT LOAM; DARK BROWN SILT LOAM; FRIABLE; PLENTIFUL ROOTS; GRAYISH WITH SPLOTCHES AND MOTTLES OF DARK BROWN AND YELLOW; SILT LOAM; GRAVELLY, LOAMY SOIL; PROBED TO 46" - NO FROST.	
"	82	HILLSLOPE	1100	N.	14%	BLACK SPRUCE, LABRADOR TEA, BLUEBERRY (OPEN, LOW-GROWING)	0-2" 2-13" 13-15" 15-20" 20-27"	FRESH, GROWING PORTION OF THE MOSS MAT (DOM. FEATHER MOSES); BROWN, FIBROUS, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS; DARK BROWN SILT LOAM; GRANULAR STRUCTURE; MANY ROOTS; GRAY BROWN GRAVELLY SILT LOAM (LIGHT); HIGHLY MICACEOUS; GRAYISH GRAVELLY, STONY SILT LOAM; TOO COARSE TO PROBE.	
"	83	HILLSLOPE	1150	N.	20%	BLACK SPRUCE (OPEN, LOW-GROWING - UP TO 20')	0-10" 10-15" 15-26" 26"	SPHAGNUM MOSS; EDGE PEAT WITH WOODY ROOTS; DARK BROWN; DARK BROWN AND DARK GRAY BROWN SPLOTCHED SILT LOAM; INCLUDES A FEW GRAVEL-SIZE ROCK FRAGMENTS; FRIABLE; PLATY STRUCTURE; WITH DECOMPOSING WOODY ROOTS; FROZEN GRAVELLY SILT LOAM; HIGHLY MICACEOUS; ICE CRYSTALS VISIBLE	
"	84	HILLSLOPE	1150	N.	30%	B. SPRUCE, WILLOW, ALDER (OPEN, LOW-GROWING)	0-5" 5-12" 12-16" 16-28" 25-30"	SPHAGNUM MOSS; DARK BROWN PARTIALLY DECOMPOSED MOSS MATERIAL (DOM. FEATHER MOSES); MANY ROOTS; DARK BROWN SILT LOAM; FRIABLE; GRAY BROWN SPLOTCHED WITH DARKER AND YELLOWER COLORS; GRAVELLY, STONY LOAM; MICACEOUS; SIMILAR TO ABOVE LAYER BUT BECOMING WETTER. PROBED TO 40" - NO FROST ENCOUNTERED	
"	85	FOOT SLOPE	800	N.	7%	BLACK SPRUCE, TAMARACK, WILLOW ("MUSKEG")	0-10" 10-22" 22-27" 27"	SPHAGNUM MOSS; MANY ROOTS; BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS; SATURATED; DARK BROWN, WELL DECOMPOSED PEAT LAYER WITH SOME SILTS; PLENTIFUL ROOTS; SATURATED; FROZEN, BUT UNIDENTIFIED, MATERIAL (TOO MUCH WATER TO OBTAIN A SAMPLE WITH A SHOVEL)	SPRUCE AND TAMARACK TREES ARE SMALL AND SCATTERED. WATER RISE TO WITHIN 2" OF THE SURFACE DURING OBSERVATION TIME.

LOCATION/VEGETY	SITE NO.	LANDFORM	ELEV.	ASP.	SLOPE (%)	DOMINANT VEGETATION	DEPTH (")	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
DAVIDSON SPRING AND SITCH (E. OF PARK CR.)	86	FOOTSLOPE	800	N	7%	B. SPRUCE, TAMARACK, LULLLOW, ("MUTKES")	0-7" 7-22" 22"	SPHAGNUM MOSS; BRIGHT BROWN BROWN DECOMPOSED SPHAGNUM MOSS AND SEDGE MATERIALS; MANY ROOTS (WOODY AND SEDGE); SATURATED FROZEN ORGANIC MATERIAL.	THIS SITE IS NEAR SITE 85. WATER RISE TO WITHIN 10" OF THE SURFACE DURING OBSERVATION TIME.
WICKERHAM LAKE (MIS) AREA ELLIOTT HWY.	87	FOOT SLOPE	1200	N	8%	CLEARED OF WOODY VEGETATION. (ORIGINALLY B. SPRUCE)	0-10" 10-11" 11-16" 16"	SPHAGNUM MOSS; MANY ROOTS VERY DARK BROWN, HIGHLY ORGANIC SILT LOAM VERY DARK BROWN SPLOTCHED WITH GRAY SILT LOAM; FRIABLE; PLENTIFUL ROOTS; LOWER PORTION SATURATED FROZEN SILT LOAM.	THIS SITE IS IN A FIRE BREAK. (100' WIDE). CLEARED OF TREES BUT NOT ALL SCALPED TO MINERAL SOIL. WATER STANDING ON MOST SPOTS THAT WERE SCALPED.
"	88	"	1200	N	5%	"	0-2" 2-20" 20-24" 24"	VERY DARK BROWN SPLOTCHED WITH DARK BROWN SILT LOAM DARK BROWN SPLOTCHED AND MOTTLED WITH YELLOWISH BROWN AND BROWN; SILT LOAM WITH LENSES OF GRAVELLY SANDS; FRIABLE; PLENTIFUL ROOTS; LOWER PORTION SATURATED VERY DARK GRAYISH BROWN SPLOTCHED WITH BROWN; SILT LOAM; FRIABLE SATURATED. FROZEN SILT LOAM.	THIS SITE IS ON A SCALPED AREA NEAR SITE 87. WATER FLOWED FREELY INTO PIT, STANDING AT 10" DEPTH AFTER DIGGING.
"	89	" (MICRO LAND FORM IS A SHALLOW DRAINAGEWAY)	1100	S	45%	BLACK SPRUCE, WILLOW (OPEN)	0-4" 4-10" 10-18" 18-29" 29"	PARTIALLY DECOMPOSED MOSS LAYER; MANY ROOTS DARK BROWN SPLOTCHED WITH REDDISH AND GRAYISH COLORS; SILT LOAM; FRIABLE; MANY ROOTS BROWN GRAVELLY SANDS; PLENTIFUL FINE ROOTS GRAYISH AND OLIVE SILT LOAM; SLIGHTLY PLASTIC; WITH MUCH DECOMPOSED WOODY MATERIAL; SATURATED. FROZEN SILT LOAM; SURFACE OF THIS FROZEN LAYER CONFORMS IN SHAPE WITH THAT OF THE GROUND SURFACE - THE FROZEN LAYER DIPS SHARPLY IN CROSSING UNDER THE DRAINAGEWAY.	THIS PROFILE WAS EXPOSED IN THE SOUTH-FACING EDGE OF THE DRAINAGEWAY, JUST OFF THE FIRE BREAK.
"	90	ALLUVIAL LOWLAND	1100	S	5%	BLACK SPRUCE (OPEN)	0-1" 1-10" 10-14" 14"	FRESH, GROWING PORTION OF THE MOSS MAT (DAMP FEATHER MOSSES) BROWN PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS DARK BROWN AND BROWN SILT LOAM; FRIABLE; PLENTIFUL ROOTS; MAT FROZEN SILT LOAM.	ADJACENT TO THE FIRE BREAK, NEAR SITE 89.
"	91	BROAD, SLIGHTLY SLOPING RIDGE WITHIN DEEPER VALLEY	1150	S	7%	CLEARED OF WOODY VEGETATION. (ORIGINALLY B. SPRUCE)	0-10" 10-26" 26"	MOSS LAYER, INCLUDING FRESH AND PARTIALLY DECOMPOSED; FEATHER AND SPHAGNUM OLIVE BROWN AND GRAY BROWN WITH MOTTLES OF BROWN, SILT LOAM; SLIGHTLY PLASTIC; WET, SEMI-FLUID OR NEARLY SO. FROZEN SILT LOAM.	IN THE FIRE BREAK, THE SURFACES OF SHOULDERED-OUT SUBSOIL MASSES BECAME SATURATED AFTER STANDING A SHORT TIME.

LOCATION & VICINITY	SITE NO.	LANDFORM	ELEV.	ASP.	SLOPE GRAD.	DOMINANT VEGETATION	DEPTH	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
WICKESHAM EURN (MID) AREA	92	FOOT-SLOPE	1050	N	15-20%	BULL-DOZED FIRE LANE. PREVIOUSLY IN BLACK SPRUCE	0-6" 6-22" 22"	DARK GRAY BROWN AND DARK BROWN SILT LOAM; FRIABLE; W/ ROOTS SPOTCHED AND MOTTLED GRAYS AND BROWNS, SILT LOAM; SLIGHTLY PLASTIC; VERY WET IN THE LOWER 6". FROZEN SILT LOAM; ICE CRYSTALS AND LENSES VISIBLE	IN A COLLAPSED "SINK" IN THE FIREBREAK; THE COLLAPSE IS ABOUT 10' LONG, 6' WIDE AND 2 1/2' DEEP. LIKELY CAUSED BY MELTING GROUND ICE. SIMILAR SLUMPING OCCURS AT SCATTERED INTERVALS OVER THAT PORTION OF THE FIREBREAK LOCATED ON THE FOOT-SLOPE.
"	93	" (MICROLAND FORM CONSIST OF A SURFACE DEPRESSED POLYGON CHANNEL)	1050	N	10%	BLACK SPRUCE, BLUEBERRY, LAB. TEA. (OPEN, LAW-GROWING)	0-8" 8-12" 12-22" 22"	SPHAGNUM MOSS; MANY WOODY ROOTS. BLACK, HIGHLY ORGANIC SILT LOAM; COARSELY PLATY STRUCTURE; FRIABLE; MANY ROOTS. DARK GRAY BROWN SILT LOAM; SLIGHTLY PLASTIC; A GRAVELLY SAND LENS IN THE LOWER PORTION OF THIS LAYER CARRIES WATER. FROZEN, ICE-RICH SILT LOAM; SURFACE OF THIS FROZEN LAYER IS KARST-LIKE - SMOOTHLY IRREGULAR; THE ICE IN THE SOIL OCCURS IN MANY FINE LAYERS (1/8" ± THICK) GIVING A PLATY APPEARANCE AND OCCUPIES ABOUT 50% OF VOLUME; SOME LARGER LENSES (1" ±) ALSO PRESENT	THIS EXAMINATION WAS MADE ON THE SAME FOOT-SLOPE THAT SITE #92 OCCURS ON AND CAN BE CONSIDERED AS THE UNDISTURBED COUNTER- PART OF THAT SITE.
ADJACENT TO ELLIOTT MUD 1/2 MI. N. OF TURN-IN TO WICKESHAM EXP. AREA.	94	ALLUVIAL SECOND BOTTOMLAND (MUD LAND- FORM IS A NARROW SLIGHT- LY DEPRESSED DRAINAGE)	1000	N	45%	BLACK SPRUCE (OPEN)	0-1" 1-4" 4-8" 8-15" 15-16" 16"	FRESH, GROWING PORTION OF THE MOSS MAT (DOM. FEATHER MOSS); BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS DARK BROWN, WELL-DECOMPOSED ORGANIC LAYER; MANY ROOTS BLACK, HIGHLY ORGANIC SILT LOAM; FRIABLE; ROOTS COMMON DARK GRAY BROWN SPOTCHED WITH LIGHT OLIVE BROWN, SILT LOAM; NON-STICKY, SLIGHTLY PLASTIC; MOIST (NOT SAT.) FROZEN SOIL SIMILAR TO ABOVE LAYER; 1/4" THICK LENSES OF ICE VISIBLE	THIS SITE WAS SELECTED SOLELY THRU PHOTO INTERPRETATION TO DETERMINE WHETHER SITES HAVING MASSIVE ICE CAN BE SO DETECTED IN TIMBERED AREAS.
"	95	"	1000	N	45%	BLACK SPRUCE (OPEN)	0-1" 1-6" 6-9" 9-13" 13-16"	FRESH, GROWING PORTION OF THE MOSS MAT BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS DARK BROWN, WELL-DECOMPOSED ORGANIC LAYER; MANY ROOTS BLACK SILT LOAM; FRIABLE, NON-STICKY; MANY ROOTS DARK GRAY BROWN, EXTREMELY STONY (75% BY VOL.) SILT LOAM; STRATIFIED; MOIST BUT NOT WET. NO FROST ENCOUNTERED TO HERE.	SECOND PHOTO INTERPRETATION TRIAL; ABOUT 12' AWAY FROM SITE #94.

LOCATION VICINITY	SITE NO.	LANDFORM	ELEV.	ASP. NEARLY LEVEL	SLOPE GRAD	DOMINANT VEGETATION	DEPTH DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
" (SITE # 95)	96	ALLUVIAL SECOND BAY TAIL LAND (MICHIGAN LAND FARM IS A SLIGHTLY ELEVATED PORTION ADJACENT TO A SLOUGH)	1000		22%	BLACK SPRUCE, TAMARACK (OPEN)	0-1" FRESH, GROWING PORTION OF THE MOSS MAT. 1-8" BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; ROOTS COMMON 3-7" VERY DARK BROWN, WELL DECOMPOSED ORGANIC LAYER; MANY ROOTS 7-14" SPLOTTED OLIVE BROWN AND BROWNS; SILT LOAM; FIRM BUT NON-STICKY; SLIGHTLY PLASTIC; SATURATED BELOW 10" 14" FROZEN SILT LOAM SIMILAR TO ABOVE LAYER; ICE CRYSTALS VISIBLE.	THIRD PHOTO INTERPRETATION TRIAL.
WASHINGTON CR. ELLIOTT HMK.	97	HILLSLOPE (LOWER SLOPE POSITION)	900	W.	35%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-1" FRESH, GROWING PORTION OF THE MOSS MAT (SEVERAL SPECIES). 1-4" DARK BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS 4-6" BLACK, HIGHLY ORGANIC SILT LOAM; FRIABLE; MANY ROOTS 6-12" V. DK. GRAY BROWN SILT LOAM WITH STREAKS OF DARKER COLORS; FRIABLE; MANY FINE ROOTS 12-30" BROWN LOAM, GRAVELLY AND SLIGHTLY COBBLY; NON-STICKY, FIRM IN PLACE 30-36" BROWN LOAM, MORE GRAVELLY THAN ABOVE LAYER; SLIGHTLY STICKY; SATURATED. 36" FROZEN SOIL, SIMILAR TO ABOVE LAYER.	THE SURFACE MICRO-RELIEF INDICATES SOME SOLIFLUCTION INFLUENCE.
"	98	HILLSLOPE (AGRICULTURE TO THE MID-SLOPE POSITION)	900	NW	45%	BLACK SPRUCE (SEMI-CLOSED)	0-6" SPHAGNUM MOSS 6-7" BLACK, HIGHLY ORGANIC SILT LOAM; MANY ROOTS 7-10" V. DK. GRAY BROWN SILT LOAM WITH DARKER STREAKS; ROOTS COMMON 10-26" DARK BROWN AND BROWNISH GRAY SILT LOAM; FEW ROOTS. INCLUDES A POCKET OF GRAVELLY LOAM - NOT A CONTINUOUS LAYER. 26" FROZEN SOIL; ICE CRYSTALS AND LENSES VISIBLE	STRONGLY SHADED SITE - FROM VEGETATION AND TOPOGRAPHY. MEASUREMENTS MADE PERPENDICULAR TO THE SURFACE.
"	99	HILLSLOPE (MICHIGAN LAND FARM IS A SMALL CLUMPED MASS)	900	NW	30%	BLACK SPRUCE (SEMI-CLOSED)	0-10" SPHAGNUM MOSS; WITH ROOTS 10-12" DK. BROWN SILT LOAM; FRIABLE; MANY ROOTS 12-16" GRAVELLY, STONY LOAM; LIGHT BROWNISH GRAY AND LIGHT GRAY SPLOTTED; SLIGHTLY STICKY, PLASTIC; QUITE MOIST BUT NOT SATURATED. 16" FROZEN MATERIAL LIKE LAYER ABOVE; ICE CRYSTALS VISIBLE; UPON MELTING, SAMPLE BECOMES A SUPER-SATURATED MUD.	

LOCATION VICINITY	SITE No.	LANDFORM	Elev.	ASP.	SLOPE GRAD.	DOMINANT VEGETATION	HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
PELIN PEAK MONUMENT	100	HILLSLOPE	900	NNW	55%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-1" 1-5" 5-7" 7-9" 9-18" 18"	FRESH GRASSING. PORTION OF THE MOSS MAT (FEATHER, REINDEER LICHEN). BROWN, PARTIALLY DECOMPOSED. MOSS MATERIAL; MANY ROOTS. VERY DARK BROWN, HIGHLY DECOMPOSED ORGANIC MATERIAL; ROOTS. BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS; SIMILAR TO SECOND LAYER BUT SOMEWHAT MORE DECOMPOSED. VERY DARK BROWN, HIGHLY DECOMPOSED ORGANIC MATERIAL WITH SOME SILTS AND MICACEOUS SANDS. FROZEN MATERIAL AS IN LAYER ABOVE; SURFACE OF THIS LAYER IS HARD, SLIGHTLY ROUNDED, AND ROUGHLY PARALLELS THE GROUND SURFACE SLOPE.	MICRO-RELIEF INDICATES SOME SOLIFLUCTION ACTIVITY BUT HUMAN ACTIVITY PARTICULARLY STANDS OUT. THE CLITE IS LACED WITH FOOT TRAILS AND PITED WITH HOLES, PRESUMABLY DUG TO EXAMINE THE PERMAFROST.
UNIT OF ALASKA	101	HILLSLOPE (LOWER SLOPE Pkt.)	600	N	<5%	BLACK, WHITE SPRUCE, SEAT. PAPER BIRCH, LAB. TEA (SEMI-CLOSED SPRUCE TYPE)	0-1" 1-5" 5-7" 7-34"	FRESH, GROWING PORTION OF THE MOSS MAT (FEATHER MOSS DOMINANT). BROWN, PARTIALLY DECOMPOSED. MOSS MATERIAL; MANY ROOTS. BLACK, HIGHLY ORGANIC SILT LOAM; MANY ROOTS. SPLOTTED BROWNS AND GRAY BROWNS; SILT LOAM; FRIABLE; PLATY STRUCTURE; ROOTS COMMON TO FEW.	THIS SITE IS NEAR THE THERMO-KARST AREA DESCRIBED IN SITE 37. NO PERMAFROST ENCOUNTERED WITHIN THE 34" EXAMINED.
WICKERSHAM BURN (1971) AREA (NEAR CUSHMAN CR.)	102	FOOT SLOPE	1200	NW	12%	BURNED (BLACK SPRUCE)	0-6" 6-12" 12-24" 24"	SPHAGNUM MOSS. BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS. GRAYISH BROWN SILT LOAM; A LARGE PIECE OF BURIED WOOD WAS EXPOSED AT BOTTOM OF THIS LAYER; LOWER PORTION OF LAYER SATURATED. FROZEN SILT LOAM; ICE CRYSTALS AND LENSES VISIBLE.	FIREBREAK AREA FROM RIDGE TO CUSHMAN CR. THIS SITE WAS LOCATED IN A SLUMPED DRAINAGE STRIPPER (NATURAL, NOT RELATED TO THIS RECENT BURNING) IN THE BURNED AREA ADJACENT TO THE FIREBREAK.
"	103	"	1200	NW	10%	BURNED (BLACK SPRUCE)	0-14" 14-21" 21"	SPHAGNUM MOSS; FRESH AND PARTIALLY DECOMPOSED; MANY ROOTS. DK. GRAY BROWN SILT LOAM; FRIABLE; WITH FINE ROOTS. FROZEN GRAY, GRAVELLY LOAM; NO ICE VISIBLE.	THIS SITE LOCATED AT HEAD OF DRAINAGE STRIPPER IN SITE #102.
"	104	SECOND BOTTOM (JUST ABOVE ALLUVIAL CREEK BOTTOM. ANCHORAGE ESTABLISHED IN MIXED DRAINAGE AREA)	1150	NW	<2%	BLACK SPRUCE (UNBURNED) (OPEN, LOW-GROWING)	0-3" 3-10" 10-14" 14-21" 21"	FRESH SPHAGNUM MOSS. BROWN, PARTIALLY DECOMPOSED SPHAGNUM; MANY ROOTS. DK. BROWN, WELL-DECOMPOSED ORGANIC LAYER. DK. GRAY, MOTTLED AND/OR SPLOTTED WITH DARK BROWN AND STRONG BROWNS; SILT LOAM; SLIGHTLY FIRM IN PLACE BUT IS NON-STICKY, NON-PLASTIC; FEW FINE ROOTS. FROZEN DARK GRAY SILT LOAM; ICE LENSES AND CRYSTALS VISIBLE; EST. < 50% ICE BY VOLUME.	PHOTO INTERPRETATION TRIAL (THIRD) FOR MASSIVE ICE IN TIMBERED AREA.

LOCATION (SHEET NO.)	SITE NO.	LANDFORM	ELEV.	ASD.	SLOPE	DOMINANT VEGETATION	HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
105	105	ALLUVIAL SEDIMENT (MICRO-ANALYSIS OF EDGE OF SAMPLE DRAINAGE)	1100	NW	<2%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-2" 2-12" 12-15" 15-18" 15-17" 17"	FRESH SPHAGNUM (AND OTHER) MOSSES BROWN, PARTIALLY DECOMPOSED SPHAGNUM MOSS MATERIAL; MANY ROOTS DK. BROWN, WELL-DECOMPOSED ORGANIC MATERIAL; MANY ROOTS AN INCLUSION: ICE MASS EXPOSED AS AN EDGE OF A ROUNDED ARC OVERLYING FROZEN SILT LOAM. BROWNISH GRAY SILT LOAM; FRIABLE, ROOTS COMMON; WET, BUT NOT COMPLETELY SATURATED. FROZEN SILT LOAM; DK. GRAY BROWN AND DK. GRAY; SURFACE OF THE FROZEN LAYER CONFORMS ROUGHLY TO GROUND SURFACE SHAPE.	
106	106	ALLUVIAL SEDIMENT (MICRO-ANALYSIS OF EDGE OF DRAINAGE)	1100	NW	<2%	P. SPRUCE (OPEN, LOW-GROWING)	0-2" 2-7" 9-15" 15"	FRESH, GROWING MOSSES - FEATHER, REINDEER LICHENS, SPHAGNUM PARTIALLY DECOMPOSED MOSS MATERIAL; LAYERED APPEARANCE RELATED TO ROOT PATTERN (STRONGLY HORIZONTAL), TO VARYING DEGREES OF DECOMPOSITION, AND TO COLORS. DK. GRAYISH BROWN SILT LOAM; FEW ROOTS FROZEN SILT LOAM; A THIN LAYER OF PURE ICE COVERS A PORTION OF THE BOTTOM OF THE SAMPLING PIT.	THE ICE IN THIS AREA (SITES 104, 105, 106) APPARENTLY OCCURS IN A COMPLEX MOSAIC PATTERN. THE ROUNDED EDGES OF ICE SHEETS AND/OR FROZEN SOIL WERE EX- POSED IN TWO OF THE THREE SAMPLE PITS.
109	109	FOOTSLIDE, LOWER EDGE POSITION (MICRO-ANALYSIS OF SMALL SCUMMED AREAS)	1150	N	5%	BURNED (P. SPRUCE)	0-7" 7-15" 18"	SPHAGNUM MOSS; MANY ROOTS, ESPECIALLY IN LOWER PORTION DK. GRAYISH BROWN SPLOTTED WITH DARK GRAY SILT LOAM; FEW ROOTS; WET BUT WATER DOES NOT MOVE INTO PIT. FROZEN SILT LOAM; ICE CRYSTALS AND THIN LENSES VISIBLE.	
110	110	HILLSLOPE, NEAR CREST	1750	NE	17%	BLACK SPRUCE (OPEN)	0-2" 2-12" 12-15" 15-17" 17"	FRESH SPHAGNUM MOSS LIGHT BROWN SPHAGNUM MOSS MATERIAL; MANY ROOTS DARK BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS DARK GRAY BROWN GRAVELLY LOAM; FIRM; FEW ROOTS. FROZEN GRAVELLY LOAM; ICE LENSES AND CRYSTALS VISIBLE (EST. <50% OF VOLUME)	IN ADJACENT, DEEPLY SCALPED FIREBREAK, THE SOIL HAS THAWED TO MORE THAN 40" (PROBABLE).
111	111	NEARLY LEVEL SSG AREA	850	NEARLY LEVEL	<2%	BLACK SPRUCE (VERY OPEN, LOW-GROWING, SEMI-DWARF)	0-10" 10-23" 25"	SPHAGNUM MOSS; LAYERED; MANY ROOTS DARK BROWN, PARTIALLY DECOMPOSED SEDGE (DOMINANT) MATERIAL; ROOTS FROZEN ORGANIC MATERIAL (SEdge PEAT?)	

LOCATION / VEGETATION	SITE NO.	LANDFORM	ELEV.	ASR.	SLOPE GRAD	DOMINANT VEGETATION	THICKNESS	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
POKER SP. - CAMPUS (CR. EAD AREA)	112	TERRACE	750	W	6%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-2" 2-6" 6-10" 10-11" 11-23" 23"	FRESH FEATHER MOSSES AND REINDEER LICHENS BROWN, PARTIALLY DECOMPOSED MOSS MATERIALS; MANY ROOTS DK. BROWN, WELL-DECOMPOSED ORGANIC MATERIALS; MANY ROOTS BLACK, HIGHLY ORGANIC SILT LOAM; FRIBLE; MANY ROOTS DK. GRAY BROWN WITH SPLOTCHES AND STREAKS OF BOTH DARKER AND MORE YELLOW COLORS; SILT LOAM; HIGHLY MICACEOUS; FEW ROOTS; MOIST FROZEN DK. GRAY BROWN SILT LOAM; THIN ICE LENSES VISIBLE (EST. 35% BY VOLUME).	
"	113	"	750	W	6%	BLACK SPRUCE, LAB. TEA (OPEN, LOW-GROWING)	0-1" 1-8" 8-16" 16"	FRESH FEATHER MOSSES BROWN, PARTIALLY DECOMPOSED MOSS MATERIAL; MANY ROOTS V. DK. GRAY BROWN WITH GRAYISH STREAKS; SILT LOAM; FRIBLE, FEW ROOTS FROZEN SILT LOAM; A FEW, THIN ICE LENSES VISIBLE.	SLIGHTLY HIGHER GROUND POSITION (IN RELATION TO SITE 112)
"	114	LOW TERRACE	800	N	45%	BLACK SPRUCE (LOW, SCATTERED), TUSSOCK SEDGES	0-16" 14-22" 22"	FRESH AND PARTIALLY DECOMPOSED MOSSES (DOM. FEATHER); MANY ROOTS DK. GRAY BROWN SILT LOAM; SLIGHTLY PLASTIC; WET FROZEN SILT LOAM; ICE LENSES VISIBLE (MOSTLY THIN, 1/8" ±)	THIS SITE IS ON THE HIGHER, BROKEN EDGE OF A SMALL DRAINAGEWAY. (CUT INTO THE TERRACE).
"	115	ALLUVIAL PAN (?)	800	W	10%	BLACK SPRUCE (LOW, SCATTERED), LAB. TEA	0-3" 3-14" 14"	FRESH AND PARTIALLY DECOMPOSED SPHAGNUM MOSS V. DK. BROWN, WELL-DECOMPOSED ORGANIC MATERIAL; BECOMES SLIGHTLY SILTY IN LOWER PORTION; MANY ROOTS; SATURATED. FROZEN HIGHLY ORGANIC SILT LOAM.	
"	116	"	800	N	8%	BLACK SPRUCE (LOW, SPINDLY), LAB. TEA, BLUEGRASS	0-3" 3-12" 12-14" 14"	FRESH SPHAGNUM MOSS PARTIALLY DECOMPOSED SPHAGNUM MOSS MATERIAL; MANY ROOTS DK. BROWN TUSSOCK SEDGE MATERIAL; PARTIALLY DECOMPOSED FROZEN TUSSOCK SEDGE MATERIAL; MUCH ICE VISIBLE (CRYSTALS AND LENSES)	THIS SITE IS ON THE CORNER, SLUMPED EDGE (LOW SCARP) THAT SEPARATES THE ALLUVIAL PAN FROM THE ALLUVIAL BOTTOM LAND.
FISH LAKE (NE. OF FAIRBANKS)	117	HILLSLOPE	1350	S.	23%	PAPER BIRCH, WILLOW, ASPEN, WHITE SPRUCE (CLOSED HARDWOODS)	0-1" 1-4" 4-10" 10-24"	FRESH MOSSES (FEATHER, LICHENS) WITH BIRCH AND ASPEN LEAVES BROWN, PARTIALLY DECOMPOSED MOSS AND LITTER MATERIAL; MANY ROOTS DK. GRAY BROWN SILT LOAM; FRIBLE; MANY ROOTS OLIVE BROWN GRAVELLY SANDY LOAM (MICACEOUS SCHIST MATERIAL); FRIBLE; ROOTS COMMON (TO 1/4" DIA.); COARSE ROCK FRAGMENTS (2-4" DIA, FLAT) BECOMING MORE NUMEROUS IN LOWER PORTION.	TYPICAL OF THE SLOPES, THINLY LOESS-CAPPED HILLSLOPE IN THE FAIRBANKS AREA; SOIL WELL-DRAINED, NO PERMANENT FROST.

1	2	3	4	5	6	7	8	9	10
LOCATION VICINITY	SITE NO.	LANDFORM	ELEV.	ASPECT	SLOPE GRAD.	DOMINANT VEGETATION	PROFILE HORIZON	BRIEF DESCRIPTION OF SELECTED PROFILE FEATURES	REMARKS
CLEARY SUMMIT (NEAR)	118	RIDGE SADDLE	2200	NEARLY LEVEL	<2%	BLACK SPRUCE, WHITE SPRUCE, ASPEN (SCRUBBY), WILLOW DWARF, BIRCH	0-4" 4-14" 14-22" 22+	FRESH AND PARTIALLY DECOMPOSED MOSSES (FEATHER) V. DK. BROWN SILT. LOAM; FRIMBLE; MANY ROOTS BROWN SANDY LOAM, WITH SOME GRAVELS; MUCH MUCK; FRIMBLE STONEY SANDY LOAM (SCHISTS)	
PALMER AREA, KNIK RIVER	119	RIVER FLOOD PLAIN	50	NEARLY LEVEL	<2%	BLACK SPRUCE (OPEN, LOW-GROWING)	0-1" 1-4" 4-10" 10-21" 21"	FRESH FEATHER MOSSES DK GRAYISH BROWN, WELL DECOMPOSED ORGANIC MATERIAL; SOME GRAY SILTS INTERMIXED. SPHAGNUM MOSS MATERIAL; MANY ROOTS INTERLAYERED ORGANIC MATERIAL (MUCH COARSE WOODY AND LEAF MATERIAL) WITH SILT SEDIMENTS AND SPHAGNUM MOSS FROZEN SILTY ORGANIC MATERIAL; ICE CRYSTALS VISIBLE.	THIS SITE IS PARTIALLY SHADED BY THE ABRUPTLY RISING MOUNTAIN SLOPE IMMEDIATELY ADJACENT ON THE SOUTH.

- COLUMN 1. LOCATION VICINITY: GENERAL AREA LOCATION ONLY. SPECIFIC LOCATION OF EACH SITE SHOWN ON THE TOPO MAP SHEETS.
2. SITE NUMBERS: CONSECUTIVELY NUMBERED IN WORKING ORDER.
3. LANDFORMS: TERMS USED ARE INTENDED TO CONVEY MORE DESCRIPTIVE INFO. THAN GENETIC INFO. (E.G., FLAT-TOPPED MOUNTAIN DIVIDE). ALSO THE TERMS USED ARE APPLICABLE MAINLY TO RELATIVELY LARGE SLOPE SEGMENTS (E.G., HILLSLOPE). ADDITIONALLY INDICATED FOR SOME SITES ARE SLOPE POSITION AND MICRO-LANDFORM INFORMATION.
4. ELEVATION: MOSTLY OBTAINED FROM U.S.G.S. TOPO SHEETS; BAROMETER DATA FOR A FEW.
5. ASPECT: COMPASS DIRECTION FOR WHICH THE LAND SURFACE FACES, PLUS LEVEL OR NEARLY LEVEL.
6. SLOPE GRADIENT: IN PERCENTAGE. MAINLY DETERMINED BY ARMY LEVEL BUT SOME SLOPES WERE VISUALLY ESTIMATED.
7. DOMINANT VEGETATION: LISTED ARE PROMINENT WOODY SPECIES AND THE PRESENCE OF GRASSES, MULLIN SEDGES, AS TOWN. ALSO INCLUDES (IN BRACKETS) ARE THE FOREST AND TUNDRA TYPE NAMES AS GIVEN IN "ALASKA TREES AND SHRUBS", U.S.D.A. AND HNDL. AC.
8. PROFILE HORIZON: MEASURED TO THE NEAREST INCH, BEGINNING AT GROUND LEVEL (I.E., TOP OF THE MOSS LAYER). THE GROUND SURFACE WAS SELECTED FOR THE ZERO REFERENCE RATHER THAN THE MINERAL SOIL MAINLY FOR PRACTICAL REASONS - EASY OF RECORDING CONSECUTIVE HORIZON DATA; ELIMINATION OF THE NEED FOR TWO ZERO REFERENCE POINTS, ONE FOR THICK ORGANIC LAYERS AND ONE FOR THINNER; TO MAKE PROBE MEASUREMENTS DIRECTLY COMPATIBLE WITH AT NEARLY ALL.
9. BRIEF DESCRIPTIONS: EMPHASIS PLACED ON THOSE PROPERTIES AND FEATURES HAVING A STRONG INFLUENCE ON THERMAL RELATIONSHIPS AND TYPICALLY INCLUDING MOSS CHARACTER, SOIL COLOR, TEXTURE, COARSE FRAGMENTS, ORGANIC MATTER CONTENT, CONSISTENCE AND ROOT ABUNDANCE, ON A HORIZON BASIS; AND CHARACTER OF FROZEN MATERIAL.
10. REMARKS: ANY OBSERVATION OR INFORMATION THAT MAY HAVE SIGNIFICANCE TO THE INTERPRETATION OF THE DATA.

— O.C. OLSEN 9/30/75